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AUTHOR Fillenberg, Carl K.
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ABSTRACT

Because employers substantiated that business and office education students often do not obtain jobs due to an inability to communicate effectively in an interview and a lack of confidence in verbal expression, a three-year project was designed to study the effects of instruction by audio-response (AR) equipment as a means of improving self-confidence and verbal participation in class. An experimental group was taught by the AR method in selected business classes while the control group was taught by the traditional methods. It was found that students who used AR for one semester significantly improved their verbal communication delivery skills. Those who used AR for two semesters, exhibited even greater improvement. However, the students did not significantly improve in self-confidence. An additional accomplishment of the study was the documenting of successful ways to use AR (e.g., the same equipment used for AR was utilized for training advanced business students in dictation and transcription) and what problems should be anticipated. (BM)

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BUSINESS AND OFFICE EDUCATION
AUDIO-RESPONSE RESEARCH PROJECT

Carol K. Fillenberg
Northglenn Senior High School
Denver, Colorado

Final Report
June 1976

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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COLORADO STATE BOARD FOR COMMUNITY
COLLEGES AND OCCUPATIONAL EDUCATION

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ABSTRACT

ABSTRACT

IMPROVEMENT OF COMMUNICATION
WITH AUDIO-RESPONSE

A research study in the Business and office education (BOE) department at Northglenn High School (NGHS) was initiated because employers substantiated that students often do not obtain jobs because they cannot sell themselves, cannot communicate effectively in an interview, and lack confidence in verbally expressing themselves.

It was predicted that students at NGHS who used audio-response (AR) equipment by talking into individual dictation-transcription units which recorded the responses on magnetic belts would be more verbally responsive and expressive as measured by a rating instrument. An example of an AR talking exercise is answering questions at the end of a chapter in a textbook. Rather than calling on one student to answer a question, all students can give an answer by talking into a microphone attached to each AR unit. All students can do the same AR exercise at the same time, or a student can do AR individually.

It was further predicted that those students who used AR would improve their confidence in verbally participating in class, would feel less shy, and would feel more tolerant of others.

The evaluation instruments were administered to experimental and control groups as a pretest and posttest at the beginning and end of each semester. The experimental group was designated as those students using

AR in selected business classes. The control group consisted of students who did not use AR. BOE classes are a semester in length so separate studies were conducted each semester of the 1975-76 school year.

Since this was the second year of the study, some students in the experimental group had more exposure to AR than others. This three-year project is designed to study the effects of repeated exposures to AR throughout a student's high school years.

It was found that students who used AR for one semester significantly improved their verbal communication delivery skills. Those who used AR for two semesters, had significantly higher skill than those who used it for one semester. When both content and delivery of verbal communication skill were measured, students did not improve their skill in one semester. Although students did not decrease shyness or superiority and intolerance for others, they did significantly improve confidence in verbally participating in class by using AR for one semester.

An additional accomplishment of this research project was the documenting of successful ways to use AR and problems to anticipate. The same equipment used for AR was utilized for training advanced business students in dictation and transcription.

This study could have an impact on the entire state by making documented records available to schools which can use AR equipment for the total educational program to enhance what is already being taught. A more qualified pool of prospective, young employees could be supplied for the community to draw upon. The State Board for Community Colleges and Occupational Education would then have a good basis for reimbursement of the AR equipment.

I . INTRODUCTION

I. INTRODUCTION

In a day of sophistication with regards to education media and technology, many individuals have virtually no ability to verbally express themselves to any real degree of sophistication upon completion of high school. In the business office, 70 percent of the communicating process is verbal. This is apparent with jobs such as court reporter, executive secretary, administrative assistant, receptionist, catalogue sales clerk, dictaphone operator, correspondence secretary, and office manager.

Presently, the office occupations classes consist mainly of girls. Because more and more women will be in managerial positions, verbal communication skills are increasingly important in order to give clear oral instructions, to compose letters, and to provide input into word processing centers or transcribing equipment. Special emphasis on the development of office-style dictation would also provide an opportunity for male students to become knowledgeable and interested in business and office management.

Statement of the Problem

This research project will help answer this question, "Is audio-response a useful teaching tool to improve students' verbal communication skills, confidence in participating in class, and tolerance for others and to decrease students' shyness?" Differential outcomes will be considered in terms of the number of audio-response classes the students had.

Purposes of the Study

To determine the effectiveness of using audio-response equipment in certain business and office education classes at Northglenn High School to improve verbal communication skills as measure by a pretest and posttest.

To develop valid and reliable measurement instruments.

To determine the effectiveness of using audio-response equipment in certain business and office education classes at Northglenn High School to improve confidence in verbally participating in class, to increase tolerance of others, and to decrease shyness.

To determine whether repeated exposure to audio-response has an effect on verbal communication skill, confidence in verbally participating, tolerance of others, and shyness.

To document successful uses of audio-response in certain business and office education classes.

To document problems to anticipate in using audio-response.

Need for the Study

In the job placement activities of the Business and Office Education Cooperative Program at Northglenn High School, it has become evident that many students do not obtain the jobs they seek because they are not confident of their abilities, cannot sell themselves, and do not express themselves well in a job interview, even though students possess appropriate skills. A letter from a prominent businessman in the community who has employed high school students is attached and also a report of the findings obtained from talking to job interviewers (see Appendix A). They substantiate the above findings.

An interview with Mr. Gene Bond, past Coordinator of Supplemental Services for Vocational Education in Adams County School District 12, pinpointed some specific problems student have who are not succeeding in vocational classes. Most of them have a poor self-image, have a poor attitude, and lack confidence. Many of them do not have sufficient reading skills, math skills, or oral communication skills. Two case histories are attached which support these findings (see Appendix A). In efforts to meet the individual learning needs of students, the teachers are hindered by the lack of tools and methods to help those students who do not adapt to written communications. The audio-response equipment should help bridge this gap to learning, and it should be effective in motivating students who have not been reached by other teaching methods.

Albert V. Brinson in an article from the February 1975 The Balance Sheet states that the number one trait in which many business-persons feel improvement is needed by employees is oral communication. He suggests that good oral communication skills will develop written communication skills, enhance self-image and self-confidence, assist meeting the public with confidence, improve grades, and enrich the class. Brinson states that good speech and verbal communication develops from an instinctive reaction instilled by consistent practice and that all business courses should habitually allow students to communicate. The article is included in Appendix A.

In summary, graduates from high school generally lack confidence in their verbal communicating ability, have a fear of speaking in public, lack skills in listening and following oral directions, cannot give

effective oral instructions themselves, and cannot effectively transcribe or dictate business correspondence. For these reasons a high percentage of students do not achieve the success they hope for on a job.

Review of Project Phases

A research study in the Business and Office Education department at Northglenn High School was initiated because employers substantiated that students lack verbal communication skills. The International Business Machines Corporation had proposed the idea of using their equipment in an audio-response mode in business and office education classes. The State Board for Community Colleges and Occupational Education offered to fund the audio-response research project at Northglenn High School.

This study is designed as a three-year project which is broken into phases corresponding with the 18-week school semesters. The major accomplishments of phase I, which took place during the 1974-75 school year, were installing audio-response equipment; establishing equipment procedures; developing successful uses for audio-response; documenting problems to anticipate in adapting audio-response to a business and office program; developing measurement instruments and reporting forms; and determining that differences existed for experimental classes between pretests and posttests which measured student ability to verbally communicate, self-confidence, self-esteem, shyness, and superiority and lack of tolerance.

Phase II of the three-year audio-response research project took place during the first semester of this 1975-76 school year. The major objectives were adapting audio-response to a number of different business and office education classes; involving a variety of instructors; documenting successful and unsuccessful uses of audio-response by type of class; and

determine whether control and experimental classes show significant differences between pretests and posttests measuring student ability to verbally communicate. Self, peer, and teacher evaluations were obtained. Differential results were considered in terms of sex, grade level, and number of semesters of audio-response use--zero, one, or two semesters.

The purpose, methods, and findings of phase II are reported in this final report for the 1975-76 school year, along with phase III. The major objectives of phase one, which took place during the second semester of this 1975-76 school year, were to develop and validate a measurement instrument which would include more information than past ones on student ability to verbally communicate; to develop valid instruments to measure confidence in verbally communicating in class; to obtain evaluations from trained evaluators; to determine whether control and experimental classes show significant differences between pretests and posttests measuring ability to verbally communicate, confidence in verbally participating in class, shyness, and superiority and lack of tolerance; and to continue collecting audio-response curriculum materials.

Hypotheses for Phases II and III.

The following null hypotheses were tested:

1. There is no significant difference in verbal communication skills of students who have used audio-response for zero, one, or two semesters.
2. There is no significant difference in confidence in verbally participating in class for students who have used audio-response for zero, one or two semesters.
3. There is no significant difference in shyness of students who have used audio-response for zero, one, or two semesters.

4. There is no significant difference in superiority and lack of tolerance of students who have used audio-response for zero, one, or two semesters.

Definition of Terms

Use of AUDIO-RESPONSE (AR) equipment--Students in the experimental classes verbally communicate at the same time by talking into individual dictation-transcription units, which record the responses on magnetic belts.

EOE (Business and Office Education) classes--All classes used for experimental or control groups are elective business classes so that students who are selected for these groups have a business and office career goal at the entry level or are surveying such careers.

LEARNING--Students in the experimental groups will have much practice verbally communicating and will be required to verbally communicate more. Thus, some learning will take place about how to organize thoughts which are communicated and how to effectively talk so that others understand. Maturation may have an effect on results, acting as an intervening variable.

NGHS (Northglenn High School)--One of the two high schools in Adams County School District No. 12 where students have met educational requirement which place them in one of three succeeding categories: sophomore, 10th grade; junior, 11th grade; or senior, 12th grade.

NUMBER of AR Classes--The number of semesters a student completes for classes he or she is officially registered which use audio-response is listed for each student during the years he or she is at Northglenn High School.

RCU (Research Coordinating Unit)--A division of the State Board for Community Colleges and Occupational Education which funds research or experimental programs in order to improve vocational education. It was originally created through federal grants authorized by the Vocational Education Acts of 1963 and 1968.

SAME teacher--A qualified instructor with a vocational credential is used for both the experimental group and its control group.

SBCCOE (State Board for Community Colleges and Occupational Education, referred to as the State Board)--A state governing body, consisting of nine members appointed by the governor, formed to cooperate with the federal authority in the administration of the federal vocational education acts. Specifically referring to the Colorado State Board in this report.

Less SHYNESS--The students are less timid and do not avoid contact with others, as reported on a self-appraisal which shows a lower score.

More TOLERANCE--The students' tendency to exaggerate the opinion of themselves and to be closed minded with others is decreased as evidenced by a lower score on a self-appraisal subscale.

Improved VERBAL COMMUNICATION SKILL--The student is more verbally responsive and expressive as indicated by improved scores on a rating scale evaluation.

Increased VERBAL PARTICIPATION IN CLASS--The students' improved attitudes about themselves and their abilities to discuss topics, answer questions, and pose questions in class are evidenced by a higher score on a self-appraisal scale.

Delimitations

This study was delimited to the following:

1. Northglenn High School 10th, 11th, and 12th graders enrolled in selected business and office education classes.
2. Five business teachers who volunteered to participate in this study.
3. Instruments used to measure the dependent variables.
4. Conditions existing in the classrooms when the tests were administered.
5. The emotional and physical condition of the students at the time of testing.
6. Business classes are elective and may thus introduce some variability that it is not possible to control. However, students do not know which classes will use audio-response. Their interest in business may equate them fairly well.
7. The variance of individual teacher effectiveness in the use of audio-response.
8. The amount of time each class spent using audio-response during the semester for experimental classes.

III. METHODS

II. METHODS

II-A. Research Design

The Nonequivalent Control Group Design (a quasi-experimental design) was used to control for possible selection bias because groups were intact. Expressed in symbols, it appears below:

$$\begin{array}{ccc} O_1 & X & O_2 \\ \hline O_3 & & O_4 \end{array}$$

X = presence of the treatment
 blank space = absence of the treatment (control)
 O_1 & O_3 = pretest
 O_2 & O_4 = posttest

In this project selected classes used the equipment due to: 1) equipment limitations, 2) a need to establish a population from which to draw a control sample, and 3) a need to establish an appropriate research design.

A schematic of the research design follows:

	Experimental Group		Control Group	
Grade 10	1st sem.	2nd sem.	1st sem.	2nd sem.
	full year		full year	
Grade 11	1st sem.	2nd sem.	1st sem.	2nd sem.
	full-year		full year	
Grade 12	1st sem.	2nd sem.	1st sem.	2nd sem.
	full year		full year	

By continuing this research for three years, results of effectiveness of the AR experience could be compared among the three years. Grade levels are considered in order to determine whether AR is more successful for particular grade levels. It is possible for a student to have exposure to the equipment through more than one class each year. This intensity of exposure provides additional data. A positive self-concept

By continuing this research for three years, results of effectiveness of the AR experience could be compared among the three years. It is possible for a student to have exposure to the equipment through more than one class each year. This intensity of exposure provides additional data. Improved verbal communication skill may be achieved in one year where a student had increased intensity of exposure, or the novelty of the project may wear off and reduce the effectiveness of the project. Grade levels and sex are considered in order to determine whether AR is more successful for particular grade levels or for males or females.

Samples for Phase II

Subjects for phase II, the first semester of the 1975-76 school year, consisted of 136 students in 7 classes (3 Business Communications, 1 Careers in Business, and 3 Shorthand I classes) designated as experimental groups using AR. Seven classes not using AR were selected (139 students), matching the same teacher as the experimental groups.

The five teachers who participated in this investigation were all volunteers. Each teacher selected one or two of the subject areas in her teaching load in which she wanted to use AR. These classes became experimental groups. A control group for each experimental group was designated from the same teacher's teaching load. When students enrolled in classes, they had no knowledge of which classes would be AR.

Since the experiment was conducted on a pilot basis last year for one semester, some students in the experimental groups have had more exposure to AR than others. An important aspect of this research is the long-term effects of more than one exposure to AR throughout a student's high school years. Thirty-four students had used AR for two semesters. The other 102

were using AR for the first time this semester. All three grade levels were represented in these classes, as well as both sexes.

Below is a schematic of the research design used for the first semester of the 1975-76 school year:

<u>Experimental Group</u>	<u>Control Group</u>
<u>Bus. Communic.--Teacher A</u>	<u>Typing I--Teacher A</u>
<u>Shorthand I--Teacher A</u>	<u>Typing I--Teacher A</u>
<u>Shorthand I--Teacher B</u>	<u>Typing I--Teacher B</u>
<u>Shorthand I--Teacher C</u>	<u>Typing I--Teacher C</u>
<u>Bus. Communic.--Teacher C</u>	<u>Typing I--Teacher C</u>
<u>Careers in Bus.--Teacher D</u>	<u>Typing II--Teacher D</u>
<u>Bus. Communic.--Teacher E</u>	<u>Coop. Off. Ed.--Teacher E</u>

A breakdown according to grade level follows:

<u>Experimental Group</u>	<u>Control Group</u>
14 Sophomores	67 Sophomores
84 Juniors	37 Juniors
38 Seniors	35 Seniors

Samples for Phase III

Subjects for phase III, the second semester of the 1975-76 school year, consisted of 20 students in a Careers in Business class designated as an experimental group using AR. A Typing I class of 22 students not using AR was designated a control group, matching the same teacher. The Careers in Business class was designated an experimental group since AR had been found especially successful in such a class.

None of the students in the experimental and control samples had used AR before this semester. All the students were sophomores except for three juniors and three seniors.

Alternative Uses of AR Equipment

The Cooperative Office Education (COE) classes used AR equipment, not for AR, but for dictation and transcription training. As a result, COE students at NGHS improved their ability to do the following:

- transcribe from oral dictation as documented by tests and assignments.
- properly punctuate transcribed material.
- spell words correctly.
- produce written communications with attractive placement and correct form.
- compose business correspondence as apparent by a comparison of work before and after dictation-transcription training.
- give oral instructions as observed by the teacher.
- dictate as observed and evaluated by teachers and fellow classmates.

Independent Variables

Independent variable. The independent variable was use of AR. This treatment consisted of using AR with existing lesson plans whenever possible. The seven classes which used AR were Business Communications (three classes), Shorthand I (three classes), and Careers in Business. Twenty-five AR units were provided, which allowed every student in a particular AR class to have a unit. (Some problems were encountered by classes larger than 25 students.)

Since classes were held in a couple different rooms, the AR equipment was made portable by placing each unit in a tray and inserting it in a storage cabinet with casters on it. Three storage cabinets held all 25 AR units and could be rolled into the required room. Students could then select a tray, remove the AR unit, place it on a desk, and plug it into an electrical outlet nearby. An IBM equipment procedure booklet with pictorial illustrations for the AR equipment was used when first instructing students in use of AR equipment.

The AR equipment worked in the same manner as dictating into a dictation-transcription machine. Four modes of communicating were used in conjunction with AR--talking, listening, reading, and writing. All students could do the same AR exercise at the same time, or a student could do AR individually. An example of an AR talking exercise would be answering questions at the end of a chapter in a textbook. Rather than calling on one student to answer a question, all students would give an answer by talking into a microphone attached to each AR unit; the answer would be recorded on a magnetic belt inserted in each AR unit. The teacher could spot check individual answers while they were given, have students turn in the belts which recorded their answers, have an individual student

play back an answer while the entire class listened, have students exchange belts and listen to each other's answers and add comments, or other such methods. An earset is attached to each AR unit for listening to recorded responses. The entire class can listen to one student's response by turning a dial on the unit to a position called "in conference."

Although it is possible to check every answer for correctness, the real value in using AR is that everyone is communicating and participating continually. The purpose of the AR equipment is not to teach AR but to teach communications through the medium of AR. Included in Appendix B is a sample teacher AR Activities Report form, which was used to gather information about the amount of usage of AR, planning necessary, successful and unsuccessful activities, favorable and unfavorable feedback, and problems and suggestions for improvement.

The independent variable for phase II was considered at three levels--students who had used AR for zero, one, or two semesters. Phase III consisted of students who had either used AR zero or one semester.

Moderator variables. The moderator variables were grade level and number of AR classes for phase II. These were treated as control variables in phase III. The type of BOE class using AR and the amount of time spent each week in AR activities could also moderate results.

Dependent Variables

Improved verbal communication skills. During phase II verbal communication skills were measured by a student self evaluation, a peer evaluation, and a teacher evaluation, shown in Appendix C. The self and

peer evaluations were administered as a pretest and a posttest to control and experimental groups. In addition, the experimental groups took the self and peer evaluation one other time in the middle of the semester for a total of three times throughout the semester. The teacher evaluation was administered to five students selected randomly from each class for the pretest and posttest.

Students responded to a question selected by the teacher from a pool of standard questions (included in Appendix C, page 128) and recorded their answers on a magnetic belt using AR equipment. That response was then evaluated according to predetermined criteria of effective verbal communications by the respondent, a peer, and in some instances the teacher. The response was extemporaneous, given without the aid of notes. A number from one to five was assigned to each degree of the rating scale. The higher the score, the better the response. A total score could range from 5 to 20 points. Instructions to teachers for administering the evaluation are in Appendix C, pages 130 and 131. A testing schedule is included on page 132.

A definitions sheet defining the terms appearing at both ends of the rating scales of the verbal communication evaluation instruments was found useful to students while evaluating responses (see Appendix C, page 129). If a student couldn't decide, for example, how convincing a response was, he or she could look at the synonyms and definitions to get a better feel for what was meant by the term.

During phase III verbal communication skills were measured by a different instrument than used in phase II. The new instrument, included on page 152 of Appendix F, was developed from a national extemporaneous speech evaluation form which is considered valid and reliable. It has

been used for approximately ten years in speech contests throughout Colorado and other states. This instrument not only measured delivery, as did the phase II instrument, but also the content of the response. Since this instrument has more items, it can differentiate the degrees of verbal communication skill better.

Students responded to a question similar to one which might be expected in a job interview. The question for the pretest was "What can you do at a job interview to help sell yourself?" The posttest question was "What skills, abilities, knowledge, and interests do you have that would make you a good employee for someone?" The extemporaneous response was recorded on a magnetic belt for evaluation purposes.

The evaluation instrument was used by two trained evaluators--an administrative secretary and a personnel director. They listened to the individually recorded responses and rated each response with a number from one to five on the rating scales. The higher the score, the better the response. The two evaluators' total scores were averaged. A total score could range from 11 to 55.

Improved confidence in verbally participating in class; less shyness; less superiority and lack of tolerance. To measure affective areas related to verbal communications, a self-appraisal inventory was given as a pretest and posttest to the experimental classes using AR and the control classes not using AR during phase III. Copies of the student directions, self-appraisal inventory, and answer sheet with scoring directions are shown in Appendix D. Validation, reliability, and differentiation spreads are on file for the Interstate Educational Resource Service Center (IERSC) Affective Subscales used; they fall within acceptable ranges for use in educational research.

Each subscale consisted of a number of items related to the same construct. An individual student's responses to these items are summed to obtain a subscore. Appendix D, page 138, includes a table presenting the range of possible scores for each subscale, and the meaning of a high score on the subscale. The scores are based on the student's self-report--his or her perceptions, feelings, and attitudes--and thus are not measures of factual data. Anonymous responses were obtained from the students in order to heighten validity. Individual results were not considered, but rather an average was calculated for control groups and experimental groups.

Attitudes are included from both ends of a continuum from poor confidence in communicating to superiority and lack of tolerance. Businesses and industries seem to agree that inability to get along with fellow workers is one of the main problems they have with beginning workers. Both ends of the continuum may be changed for the better by using AR. The item statements in each of the subscales are listed on page 138. Instructions to teachers for administering the self-appraisal inventory are in Appendix D, page 140.

Student and Teacher Questionnaires

A student or teacher questionnaire was filled out by experimental groups in phases II and III and the five volunteer teachers in order to provide additional feedback on the value of AR in business classes. A copy of these questionnaires is in Appendix E.

Systems Approach

A systems approach is included in this report in order to document in a clear, brief manner the many entities and coordinated activities which constitute this research project. A "system" is a group of interdependent entities which work together to accomplish a goal or purpose. The "research system" works within a suprasystem of the total instructional program. The instructional program is part of an environment which includes influences of school and district policies, state education guidelines, community goals, and student needs and goals.

The cellular systems approach on page 25 serves as a guide for planning, developing, implementing, and evaluating the research project. In addition, a PERT (Performance Evaluation and Review Technique) chart establishes a time sequence of specific activities and events of the systems approach to planning. The chart on page 36 is a modified PERT chart since only one time estimate is given. Milestones are indicated with critical dates. At these points evaluation is appropriate to determine whether or not the project is on schedule and progressing as planned. Terms used in the systems approach are defined on pages 26 to 35.

Assumptions for Systems Approach

The following assumptions were made as a basis for the preparation of this systems approach:

- The research must take place within the established and functioning framework of a high school's instructional program.
- Each semester students register for new classes so the research design of this project based on intact classes must be reconsidered each semester.
- The research project is tentatively to be conducted for three consecutive school years, but it can be terminated at any time that it can be shown that AR equipment cannot be used successfully in BOE classes. The project is evaluated for funding on a yearly basis.
- Limited resources are available such as facilities, personnel, equipment, supplies.
- Time, money, and personnel are made available by the BOE department and vocational program of NGHS to help assure an effective research effort.
- The NGHS BOE department supports curriculum innovation and adoption of successful and tested teaching methodology.
- Curriculum decisions that are made by the State Board and the institution are based on research whenever possible.
- A need for the audio-response research project at NGHS has been verified.

DOCUMENTATION

Systems Approach to
Audio-Response Research Project

The decision chart for the audio-response research system is depicted by a "cellular" representation of entities. Following is an explanation of those cells which are not self-explanatory:

- Cell 1 represents the entities which either make up the institution or have a direct input into function, policies, or procedures of the institution.
- Cell 2 represents the environmental factors--social, civic, economic, and political--which influence the function, policies, or procedures of the institution.
- Cell 3 illustrates that predetermined needs surveys help determine the institution curriculum and specifically the BOE program offerings. BOE instruction is job-related and incorporates work experience in terminating programs.
- Cell 4 represents the State Board for Community Colleges and Occupational Education. The RCU (Research Coordinating Unit) initiated a request for research based on input from the State BOE Supervisor and IBM Corporation personnel.
- Cell 5 suggests that predetermined institutional policies have been established from a broad philosophy and purpose.

- Cell 7 shows that within the framework of institutional function, policies, and procedures, a predetermined BOE framework is established which is compatible.
- Cell 8 is the BOE program, which offers skill development and related knowledge for jobs in four occupational areas--clerical, secretarial, accounting, and data processing.
- Cell 9 is the Audio-Response (AR) Research Project being conducted in the BOE department at Northglenn High School (NGHS) in Adams County District No. 12. It is a 3-year project which is broken into phases which correspond with an 18-week school semester. The project is reconsidered for financing each school year.
- Cell 10 represents the research project director and principal investigator, who were selected by the State Board and institution.
- Cell 11 represents information and decisions which go into the planning of the project. See page 4 for the purpose of the AR research project.
- Cell 12 is a preliminary research proposal providing basic information (see Cell 11) to the State Board RCU in order to determine whether further planning and writing of a comprehensive research proposal should take place.
- Cell 13 asks whether the various entities of the institutional system support the research project. Approval and support from the district; NGHS principal; and BOE curriculum coordinator, department head, and faculty are vital to the success of the research project. Meetings as well as individual contact would take place.
- Cell 14 is a decision based on the planning outlined in the preliminary research proposal of Cell 12. The RCU and State BOE Supervisor either approve continued planning or reject preliminary plans as proposed for NGHS. In the latter event, the project might be

terminated or considered in a different school, preplanning might need modification, or the preliminary proposal might need revision.

Cell 15 shows that a research committee is organized to advise, direct, and approve research activities. The committee is composed of the NCHS principal, project director, principal investigator, BOE curriculum consultant, BOE department head, State BOE Supervisor, State Research Director, and teacher investigators participating in the experiment.

Cell 16 indicates that the problem to study must be delimited and broken down until it is clearly defined.

Cell 17 depicts relevant theories and concepts which are applied through reading and thinking in order to define the problem.

Cell 18 is a literature search for relevant findings and theories which help define the problem and support the need for further research of the problem.

Cell 19 involves organizing the participants and fiscal plan. Teacher investigators are selected from volunteers to conduct the experiment in BOE classes, and experimental subjects are tentatively determines. A tentative fiscal plan is developed which includes pay to teacher investigators for their time and effort.

Cell 20 suggests that the research project must be integrated into the organization and procedures of the BOE department so that is is not unduly disruptive or contrary to the instructional program. Considerations include class scheduling, makeup of classes, space and facility requirements, and equipment utilization and maintenance.

Cell 21 is the identification of the following variables which are operationally defined: independent, dependent, moderator, control, and intervening.

Cell 22 identifies the research hypotheses expressed in the null form for the purpose of statistical analysis.

Cell 23 is the research design which is finalized by considering variables, hypotheses, participants, and research conditions. Control and experimental units are assigned, the treatment defined, and evaluation procedures specified.

Cell 24 is a checkpoint which questions the feasibility of the finalized research design. Is it a workable plan considering the framework and staff of the BOE department? If not, the research design must be modified by reconsidering participants, the fiscal plan, relationship of the research to the present program, variables, and hypotheses. If it appears feasible, one would proceed to the next decision cell.

Cell 25 represents the approval from the research committee of the finalized research design. If modifications are required, the same elements would be reconsidered as were summarized in Cell 24.

Cell 26 is a decision cell designed to guide the reader along the proper path. The initial phase of the 3-year research project requires some activities which are not repeated during subsequent phases, such as writing the 3-year proposal and purchasing AR equipment. Thus, the first time through the systems chart, one proceeds from Cell 26 to Cell 27 in order to prepare for writing the 3-year proposal.

- All other phases of the research project repeat one section of the processes or cells visualized by this systems chart so that once the 3-year proposal is written, activity Cell 35 follows Cell 26.
- Cell 27 represents project requirements specified by the State Board, such as proposal format, reporting requirements, and budget requirements.
- Cell 28 considers the district vocational budget since some matching or "in kind" funds are required to match State Board funds provided.
- Cell 29 shows that several budget alternatives are proposed which correspond with alternatives in implementation and the research design. The budgets include estimates for line items, breakdown according to local or RCU source of funds, and justification for line expenditures.
- Cell 31 represents the decision of the State Board to approve the research project as proposed and to authorize one of the budget alternatives or to reject the proposal as presented. In the latter decision, one would review the project requirements, the budget alternatives, and the written proposal to modify and change them in order to gain State Board Approval.
- Cell 32 shows that AR equipment, 25 IBM Executary Dictation-Transcription machines, are purchased. Other activities involved are providing for storage, checking for power outlets, devising a maintenance plan, and devising utilization procedures.
- Cell 33 breaks down the 3-year research project into phases. Most classes are one semester in duration so that research design must be revised and planned each semester in order to incorporate that semester's course offerings, class schedules, class composition, teacher investigator volunteers, classroom assignments, equipment utilization, and space and facility requirements. A yearly

budget proposal with recommendations for future research is submitted for approval at the end of each project year.

Cell 34 illustrates that the purpose, goals, and objectives of the 3-year project must be reviewed in order to specify the immediate ones for the first phase or semester. When this task is completed, the decision chart feeds back to Cell 19 in order to establish the immediate research design for that phase.

Activities represented by Cells 19 through 26 and 35 through 68 are repeated as described in the preceding documentation except that plans are for the immediate phase (one semester) rather than for the overall three-year project. Cell 26 is followed by Cells 35 through 68 as part of each research phase. The PERT chart on page 36 represents a planning network for phase III of the research project (Cells 19-26, 35-68 of this Systems Chart) with time and a critical path indicated.

Cell 35 shows that a search is conducted for valid instruments to measure the dependent variables for the current research phase.

Cell 36 indicates that if valid and reliable instruments can be found, one proceeds to the next decision cell. If none are found, one must construct measurement instruments.

Cell 38 shows that the constructed instruments must be validated according to appropriate research techniques.

Cell 39 indicates that after instruments are tested, if results verify that they are valid and reliable, the next step is to obtain appropriate approval. The instrument construction and validation process continues until valid and reliable instruments have been

Cell 41 represents the process of designing the measurement instruments, including item construction and order, rating scale, format, heading, student directions, teacher administration directions, answer sheet, evaluation procedures, scoring procedures. Any other reporting forms should also be designed at this time, and all final copy forms are reproduced by an appropriate method and in an appropriate quantity.

Cell 42 depicts the implementation schedules which are developed for utilization of equipment, administration of measurement instruments, evaluating measurements, scoring instruments, reporting by teacher investigators, and evaluating the research project.

Cell 43 identifies a briefing session for the research committee and participants to relate information about implementation procedures and schedules, to assure understanding of the research design, and to address concerns or problems.

Cell 44 is a decision to determine whether or not teacher investigators need any type of training in order to carry out their research responsibilities. Some research phases may utilize teacher investigators who have already received ample training in previous phases; and thus, additional training may not be necessary.

Cell 45 is the scheduling and planning of a workshop to assist teacher investigators with the technical operation of AR equipment, with methods for using AR, or with adaption to lesson plans. The purpose, agenda, time, place, financing, and curriculum materials must be considered. Substitutes for teachers might be required and consultants could be invited.

Cell 46 shows that AR is adapted to already existing lesson plans. It is a teaching technique used in existing courses. There is some initial planning required in order to use AR, but it is minimal.

Cell 47 represents the activities involved in selecting and training evaluators who listen to recorded oral responses of experimental and control subjects and rate the responses according to predetermined and validated rating instruments.

Cell 49 shows that teacher investigators use AR equipment in designated BOE classes; collect data according to the research design; and give feedback on the implementation schedule, the budget, performance, maintenance of equipment, and successful and unsuccessful uses of AR.

Cell 50 is a checkpoint asking whether implementation is progressing as scheduled. At any time a problem occurs, the principal investigator should proceed through the activities preceding implementation. Modifications in the implementation schedule may be necessary. A briefing meeting may clear up a misunderstanding, confusion, or concern. Additional training in the use of AR may be advisable. Changes in the use of AR may need to be reflected in lesson plans.

Cell 51 illustrates that statistical tests are selected to test the null hypotheses of the research project.

Cell 52 is the preparation of input for computer analysis. This involves organizing the data; coding data; planning card fields; and punching computer system cards, control cards, program cards, and the data file cards.

Cells 53-57 are steps in the statistical analysis and reporting process.

Cell 58 is a comparison of actual expenditures with anticipated spending indicated in the budget for the current research phase.

Cell 59 represents an evaluation of the research project to determine whether or not the study should continue and to improve procedures for possible future research.

Cell 60 is a decision by the research committee, based on the research project evaluation, to determine whether the study will continue. If it will not, budgeting for the next phase is eliminated. Budgeting would likewise be unnecessary if this is the last phase of the three-year project.

Cell 61 identifies budgeting for the next research phase since the State Board approves research project funding on a yearly basis.

Cell 62 represents recommendations for further research that will either be incorporated into the next research phase or suggested for other possible research efforts if this is the last phase of this project.

Cell 63 is the approval of the rough draft of the report by the project director. At the end of each semester, a report is required by the State Board.

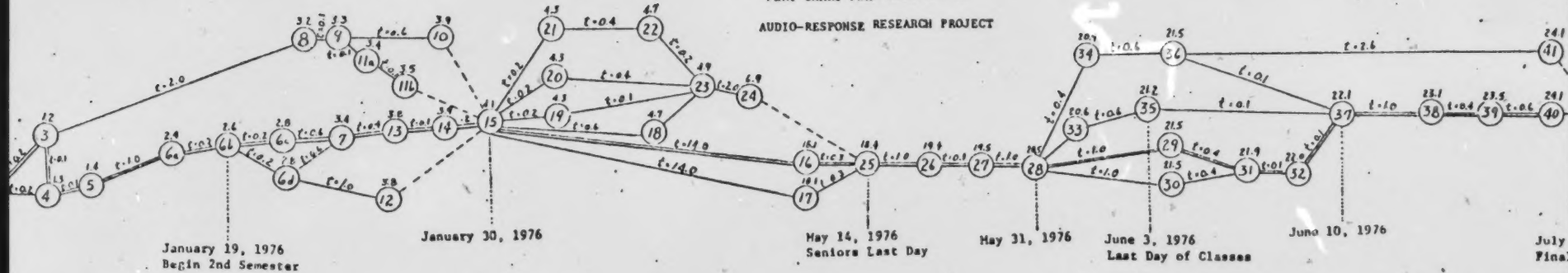
Cell 65 shows that the final report is reproduced and submitted to the State Board, as well as other research committee members and interested parties

Cell 66 is the authorization to continue or the discontinuance of the AR research project by the State Board RCU.

Cell 67 is a decision to guide the reader on to the next research phase if the project is continuing or to the END cell if the last phase has been completed or the project has been discontinued.

Cell 68 is a review of the purpose, goals, and objectives for the next research phase before repeating the activities of Cells 19-26, 35-68.

PERT CHART FOR PHASE III OF
AUDIO-RESPONSE RESEARCH PROJECT



1. START
2. ESTABLISH PURPOSE, GOALS, & OBJECTIVES
3. SPECIFY & OPERATIONALLY DEFINE VARIABLES
4. DETERMINE HYPOTHESES & MAKE PREDICTIONS
5. ORGANIZE FISCAL PLAN
- 6a. DETERMINE TENTATIVE RESEARCH DESIGN
- 6b. ANALYZE STUDENT ENROLLMENT CHOICES
- 6c. MATCH STUDENT CHOICES TO AVAILABLE FACILITIES & PERSONNEL
- 6d. SELECT RESEARCH TEACHER INVESTIGATOR
7. FINALIZE RESEARCH DESIGN
8. SEARCH FOR & DEVELOP REPORTING FORMS & VALID & RELIABLE MEASUREMENT INSTRUMENTS
9. GET APPROVAL OF MEASUREMENT INSTRUMENTS & REPORTING FORMS
10. TYPE & REPRODUCE INSTRUMENTS & FORMS
- 11a. SELECT EVALUATORS
- 11b. TRAIN EVALUATORS
12. ADAPT AR TO LESSON PLANS
13. ESTABLISH IMPLEMENTATION SCHEDULE
14. BRIEF RESEARCH COMMITTEE AND PARTICIPANTS
15. ADMINISTER PRETEST TO EXPERIMENTAL & CONTROL CLASSES.

16. TEACHER INVESTIGATOR USES AR IN EXPERIMENTAL CLASS & SUBMITS WEEKLY REPORTS
17. REVIEW WEEKLY TEACHER REPORTS & SOLVE IMPLEMENTATION PROBLEMS
18. EVALUATE AND SCORE PRETESTS
19. COLLECT GPA & IQ DATA
20. PLAN DATA PROCESSING CARD LAYOUT FOR DATA FILE
21. DETERMINE STATISTICAL TESTS
22. PLAN PROGRAM CARDS FOR COMPUTER
23. PUNCH PROGRAM & DATA FILE CARDS
24. WRITE ROUGH DRAFT OF REPORT INTRODUCTION & PROCEDURES
25. ADMINISTER POSTTESTS
26. EVALUATE & SCORE POSTTESTS
27. PUNCH POSTTEST DATA
28. PROCESS STATISTICAL PROGRAM

29. INTERPRET STATISTICS
30. PREPARE GRAPHS & TABLES
31. DRAW CONCLUSIONS
32. WRITE ABSTRACT
33. REVIEW BUDGET
34. EVALUATE RESEARCH PROJECT
35. PREPARE BUDGET PROPOSAL FOR NEXT PHASE OF PROJECT
36. MAKE RECOMMENDATIONS FOR FUTURE RESEARCH
37. GET APPROVAL OF FINAL REPORT ROUGH DRAFT & BUDGET PROPOSAL
38. PREPARE FINAL COPY OF FINAL REPORT
39. REPRODUCE FINAL REPORT
40. DISSEMINATE FINAL REPORT
41. PLAN FOR NEXT PHASE OF RESEARCH PROJECT
42. END CURRENT PHASE OF RESEARCH PROJECT

III. FINDINGS AND
INTERPRETATION

Phase Two

III. FINDINGS AND INTERPRETATION

Phase Two

This study was undertaken to determine the relationship between the use of audio-response (AR) in business and office education (BOE) classes and selected cognitive and affective measurements. The measurements were verbal communication skill, ~~superiority and lack of~~ tolerance, shyness, and verbal participation in class. These were considered by sex, grade level, and number of semesters of using audio-response. Pretest and posttest measurements were compared for experimental classes using audio-response and control classes not using it.

This study is planned for a three-year period and has been broken down into phases. The first phase was completed during the 1974-75 school year. Phase two took place during the first semester of the 1975-76 school year, and phase three took place during the second semester of the 1975-76 school year. Findings from phases two and three are being presented in this report.

For purposes of testing the level of significance, the .05 level was chosen. However, the .01 level of significance was also reported.

Phase Two

The population sample for phase two included the following: (1) 136 students in 7 BOE classes designated as experimental classes--3 business communications, 3 shorthand I, and 1 careers in business; and (2) 139 students in 7 BOE classes designated as control classes--4 typing I,

1 typing II, 1 filing and record keeping, and 1 cooperative office education.

The experimental classes used AR during the semester included in phase two of this study. Some students had two semesters of experience using AR, either by being in two experimental classes during phase two or by using AR during the previous semester as well as the phase two semester. The control classes did not use AR, and none of the students had previously used it. A control and experimental class were matched for each participating teacher.

Table 1 shows the breakdown of the experimental group by class, grade level, number of semesters of AR use, and sex. Table 2 shows the breakdown of the control group by class, grade level, and sex. All students in the control group had zero semesters of AR use.

The self, peer, and teacher instruments measuring verbal communication skill for phase two are shown on pages 125-127. They measure the delivery aspects of verbally communicating. A pretest and posttest were administered to the experimental and control groups at the beginning and end of the semester. A student's response to a question was recorded on the AR equipment and rated on the measuring instrument by the student himself or herself and a peer. The teacher rated a sampling from each class. An average score from the student self and peer evaluations were calculated for each student and used for analyzing the hypotheses. A mean verbal communication score represents the average of self and peer ratings on a four-item instrument. Each item is rated on a scale with five degrees. Scores range from 4 to 20 points.

TABLE 1
Population Sample for
Experimental Group of Phase Two

Class	*No. of Students	Grade			AR Use # of Semesters			Sex	
		Soph.	Jr.	Sr.	0	1	2	Male	Female
08-Bus. Commun.	19	0	2	17	--	10	9	0	19
09-Shorthand I	22	0	20	2	--	18	4	0	22
10-Shorthand I	23	0	23	0	--	21	2	0	23
11-Shorthand I	20	0	18	2	--	16	4	0	20
12-Bus. Commun.	18	0	12	6	--	10	8	0	18
13-Careers in Bus.	15	14	1	0	--	15	0	1	14
14-Bus. Commun.	19	0	8	11	--	12	7	0	19
TOTAL	136	14	84	38	--	102	34	1	135

* Unduplicated count--no repeats shown for students in more than one class in the research design

TABLE 2
Population Sample for
Control Group of Phase Two

Class	*No. of Students	Grade			AR Use # of Semesters			Sex	
		Soph.	Jr.	Sr.	0	1	2	Male	Female
01-Typing I	14	8	6	0	14	--	--	4	10
02-Typing I	21	19	2	0	21	--	--	5	16
03-Fil. & Rec.	19	12	2	5	19	--	--	0	19
04-Typing I	28	3	11	14	28	--	--	20	8
05-Typing I	25	3	16	6	25	--	--	15	10
06-Typing II	22	22	0	0	22	--	--	2	20
07-COE	10	0	0	10	10	--	--	0	10
TOTAL	139	67	37	35	139	--	--	46	93

*Unduplicated Count

Phase Two
Analysis of Verbal Communication Skill
of BOE Students Based on
Number of Semesters of AR Use

Null Hypothesis 1. There is no significant difference among the verbal communication scores of groups who used AR for zero, one, or two semesters.

One-way analysis of variance on pretest and posttest scores was used to test the null hypothesis. There were 20 points possible on the instrument measuring verbal communication skills. An average of the self and peer ratings were used.

The mean verbal communication pretest and posttest scores are shown in Table 3. The number of cases in each group slightly varies between the pretest and posttest because of missing data due to adds, drops, and absences.

TABLE 3

Mean Verbal Communication Scores
by AR Use for Phase Two

Semesters of AR Use	N	Pretest	N	Posttest	Gain
0	131	12.8435	135	13.6444	.80
1	95	12.6895	89	15.2360	2.55
2	32	12.8906	30	16.4333	3.54
Total	258	12.7926	254	14.5315	1.74

The control group, not using AR, increased their mean verbal communication skill by .80 points. The group who used AR for one semester increased their communication skill by 2.55 points. The greatest increase was realized by the group who had used AR for two semesters, showing a 3.54 point gain.

The 95% confidence intervals for the pretest and posttest means of the three AR user groups are graphed on page 43. One can be 95% confident that the actual population mean of each group lies within the interval graphed for that group. The upper and lower limits of each interval are indicated. Also, the sample mean for each group is indicated below the horizontal axis.

It is clear from the pretest graph that the three groups were more than likely from the same universal population since the mean confidence intervals greatly overlap. Table 4 shows the one-way analysis of variance table for pretest scores by AR use. Since the pretest was administered at the beginning of the semester, most students would not have used AR yet. Some students in the experimental group would have used AR for a semester during phase one of this study.

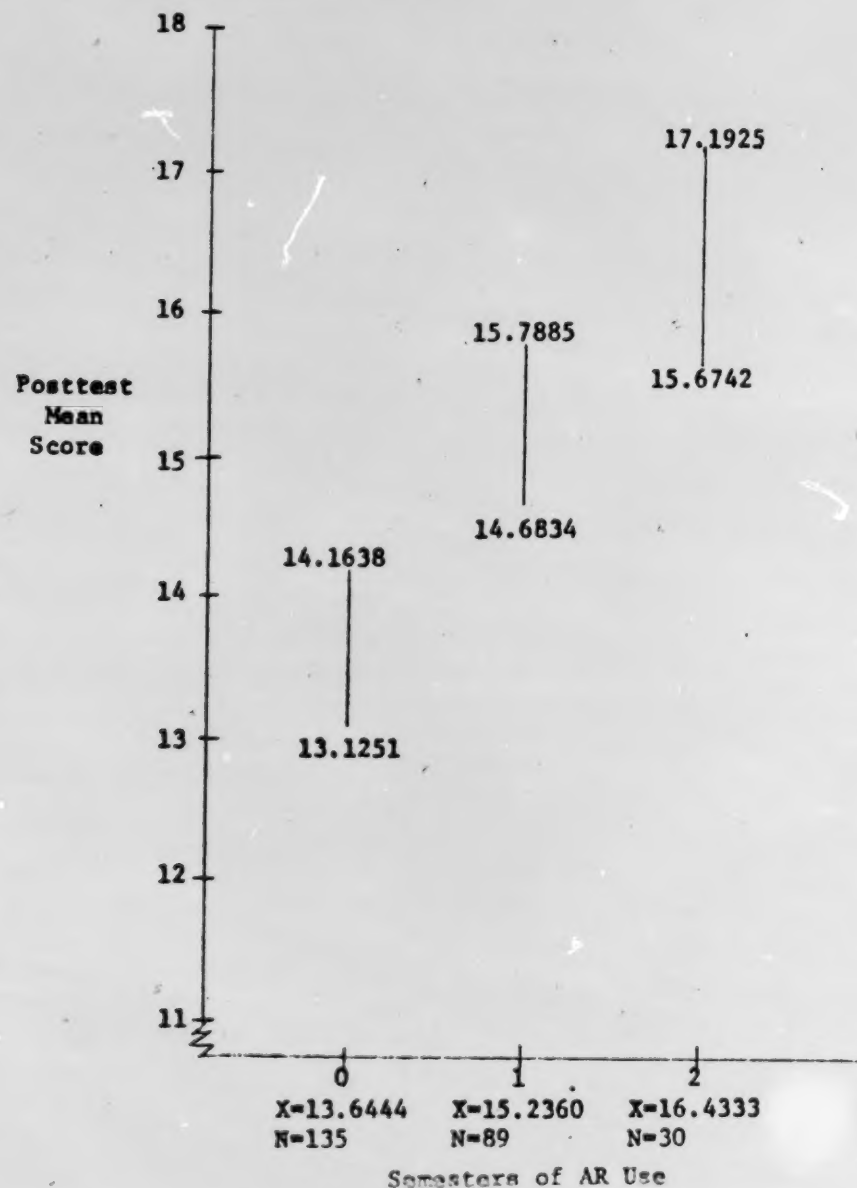
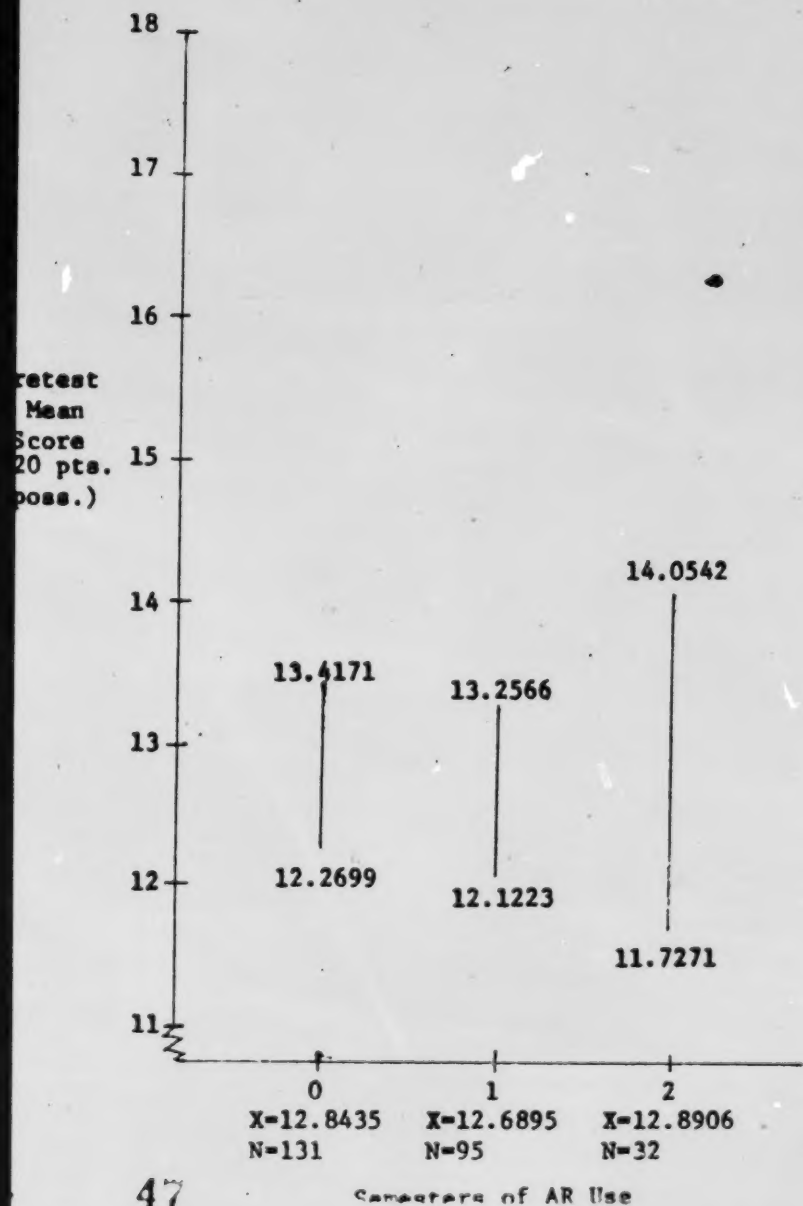
TABLE 4

Analysis of Variance Summary Table
for Verbal Communication Pretest
Based on Number of Semesters of AR Use

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	2	1.6574	.8287	.085
Within Groups	255	2482.9986	9.7372	
Total	257	2484.6560		

GRAPH

95% Confidence Intervals for Mean Scores
on Verbal Communication Skill Pretest and Posttest
by Number of Semesters AR Was Used



There was no significant difference among the means on the pretest of verbal communication skill of the three AR user groups. (.918 F probability)

Comparing mean confidence intervals of the posttest (page) for those who had used AR zero semesters and those who used AR for one semester, one can be 95% confident that they are from different populations. Since they started out in the same population, AR made a significant difference in improving verbal communication skill of the treatment group.

Table 5 shows that there is a significant difference between mean posttest verbal communication scores of the control and experimental classes at greater than a .01 level of significance. Further analysis is necessary to determine whether there is a significant difference between verbal communication skill of those who used AR for one semester or two semesters, since there is overlap in the confidence intervals on the posttest graph on page .

TABLE 5

Analysis of Variance Summary Table
for Verbal Communication Posttest
Based on Number of Semesters of AR Use

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	2	258.9031	129.4515	16.470*
Within Groups	251	1972.8449	7.8599	
Total	253	2231.7480		

* Significant at greater than .01 confidence level

Table 6 shows, that there is a significant difference between posttest scores of groups who used AR for one or two semesters at the .05 level of confidence.

TABLE 6

Analysis of Variance Summary Table
for Verbal Communication Posttest
Based on One or Two Semesters of AR

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	1	32.1682	38.1682	5.188*
Within Groups	117	725.4116	6.2001	
Total	118	757.5798		

*Significant at the .05 confidence level

There is much room for improvement in verbal communication delivery skills, as measured by an instrument developed by the researcher.

Table 7 shows that on a scale of 1 to 5, the control class scored 3.4111 on the average for each criterion of the verbal communication skill test at the end of phase 2. There were four items to rate on the test. The group who used AR for one semester scored 3.8090 per item. For those who had used AR two semesters, the average per item score was 4.1083.

TABLE 7

Average Item Score on
Verbal Communication Posttest
by Semesters of AR Use for Phase Two

Semesters of AR Use	N	Pretest Score Per Item	N	Posttest Score Per Item
0	131	3.2109	135	3.4111
1	95	3.1724	89	3.8090
2	32	3.2227	30	4.1083

It is clear that AR significantly increases verbal communication skill of BOE students. An instrument with more than four items would have probably differentiated scores even more. Since the time devoted to AR use is somewhat limited by competition with other teaching techniques and subject matter, I feel the increases shown are especially notable. AR was used 7.58 percent of the total class time available during phase two. AR was adapted to already existing curriculum programs and lesson plans.

The null hypothesis that there is no significant difference among verbal communication skills of those students who have used AR for zero, one, and two semesters was rejected.

Phase Two
Analysis of Verbal Communication Skill
of BOE Students Based on
Number of Semesters of AR Use
Controlling for Initial Differences

Null Hypothesis 2. There is no significant difference in verbal communication skill among groups who have used AR for zero, one, or two semesters, adjusting for pretest scores on verbal communication skill.

A single-classification analysis of covariance was used to test the null hypothesis. In order to better determine how much improvement in skill was attributable to AR use during the semester of phase two, pretest scores on verbal communication skills were statistically equated, as if no initial differences in communication skill existed. Posttest scores were adjusted accordingly.

Table 8 shows unadjusted and adjusted posttest means for verbal communication skill and means for the pretest for verbal communication skill.

TABLE 8

Criterion and Control Variable Means
Based on Semesters of AR Use
for Phase Two

AR Use	N	Criterion		Control
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill
		Unadjusted	Adjusted	
0 Semesters	131	13.75	13.72	12.8435
1 Semester	95	15.22	15.27	12.6895
2 Semesters	32	16.63	16.58	12.8906
Total	258			12.7926

With each additional semester of AR use, the groups increasingly improved their verbal communication skill. The mean posttest score for the control group with no AR use, adjusted for pretest differences was 13.72. The adjusted mean for the group who had used AR for one semester was 15.27. Those who used AR two semesters had an adjusted mean of 16.58.

Table 9 shows the analysis of covariance table. There was a significant difference among the posttest verbal communication means at the .01 level of confidence of the three groups who used AR zero, one, or two semesters, when controlling for pretest scores.

TABLE 9

Analysis of Covariance Summary Table
for Verbal Communication Posttest Controlling
for Verbal Communication Pretest
Based on Semesters of AR Use

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Covariate Pretest	1	149.587	149.587	20.474*
Main Effect AR Use	2	245.711	122.856	16.815*
Residual	234	1709.631	7.306	
Total	237	2104.930	8.882	

*Significant at greater than .01 confidence level (.001)

Controlling for initial differences in the pretest of verbal communication skill, 18.8 percent of the variation in posttest verbal communication skill is accounted for by the amount of AR use (zero, one, or two semesters).

Null hypothesis 2 that there is no significant difference in verbal communication skill among groups who have used AR for zero, one, or two semesters, adjusting for pretest scores on verbal communication skill, was rejected.

Phase Two
Analysis of Verbal Communication Skill
of BOE Students Based on
Grade Level Controlling for Initial Differences

Null Hypothesis 3. There is no significant difference in posttest verbal communication skill among sophomores, juniors, and seniors, adjusting for pretest scores on verbal communication skill.

Single classification analysis of covariance was used to test the null hypothesis.

As Table 10 shows, treatment students started out with significant differences at the .05 confidence level in verbal communication skill. Juniors and seniors had the opportunity for more exposure to AR than sophomores previous to phase two.

TABLE 10

Analysis of Variance Summary Table
for Verbal Communication Pretest
for Experimental Group
Based on Grade Level

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	2	53.2283	26.6141	3.303*
Within Groups	124	999.1969	8.0580	
Total	126	1052.4252		

* Significant at the .05 confidence level (.04)

The groups maintained differences even though equated on pretest scores. Table 11 shows that the treatment group sophomore and senior scores adjusted up because those students started out with less communication skill. The senior mean score adjusted down because seniors were initially superior in verbal communication skill. Adjusting for pretest scores, seniors still showed the greatest skill and juniors were next in line.

TABLE 11

Criterion and Control Variable Means
Based on Grade Level for Phase Two
for Experimental Group

Grade Level	N	Criterion		Control
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill
		Unadjusted	Adjusted	
Sophomores	13	14.34	14.51	11.9615
Juniors	77	15.20	15.26	12.3961
Seniors	37	16.95	16.73	13.7297
Total	127	15.57	15.57	12.7402

Comparing 95% confidence intervals for pretest and posttest mean scores for the three groups, it is apparent that there were significant increases in communication skill at all grade levels, having used AR for one or two semesters. Table 12 shows the confidence intervals.

TABLE 12

95% Confidence Intervals
for Mean Score on Verbal Communication
Pretest and Posttest of Experimental Group
Based on Grade Level

Grade Level	N	Pretest 95% c.i.	N	Posttest 95% c.i.
Sophomores	13	11.0681 to 12.8550	14	13.3295 to 15.7419
Juniors	77	11.6892 to 13.1030	74	14.5035 to 15.7668
Seniors	37	12.8764 to 14.5830	31	16.3906 to 17.5126
Total	127	12.2326 to 13.2477	119	15.0779 to 15.9978

Table 13 is a summary table for the analysis of covariance showing a significant difference at the .01 confidence level among grade levels on verbal communication skill of the experimental classes.

TABLE 13

Analysis of Covariance Summary Table
for Verbal Communication Posttest Controlling
for Verbal Communication Pretest
Based on Grade Level of Experimental Group

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Covariate Pretest	1	84.311	84.311	15.469*
Main Effects AR Use	2	59.426	29.713	5.452**
Residual	107	583.186	5.450	
Total	110	726.923	6.608	

* Significant at the .01 confidence level (.001)

**Significant at the .01 confidence level (.006)

Controlling for initial differences in the pretest of verbal communication skill of the experimental group, 19.8 percent of the variation in posttest verbal communication skill is accounted for by the differences in grade level.

For the control group which has never used AR, the three grade levels started out with no significant difference in verbal communication skill. Table 14 is a summary table for this analysis. (.868 F probability)

TABLE 14

Analysis of Variance Summary Table
for Verbal Communication Pretest
for Control Group
Based on Grade Level

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	2	3.1748	1.5874	.142
Within Groups	128	1428.3672	11.1591	
Total	130	1431.5420		

Controlling for pretest verbal communication scores, the adjusted posttest mean of sophomores with no AR training was slightly greater than the other grade levels. Table 15 shows that the senior adjusted mean is lowest. This is especially interesting since the seniors out-performed the other grade levels after they had received AR training in the experimental group.

TABLE 15

Criterion and Control Variable Means
Based on Grade Level for Phase Two
for Control Group

Grade Level	N	Criterion		Control
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill
		Unadjusted	Adjusted	
Sophomores	66	14.26	14.23	12.9848
Juniors	33	13.71	13.72	12.7879
Seniors	32	12.74	12.80	12.6094
Total	131	13.75	13.75	12.8435

Referring to Table 16, it is probable that no particular grade level significantly improved between the pretest and posttest since the confidence intervals of the means for the pretests and posttests overlap.

TABLE 16

95% Confidence Intervals
for Mean Score on Verbal Communication
Pretest and Posttest of Control Group
Based on Grade Level

Grade Level	N	Pretest 95% c.i.	N	Posttest 95% c.i.
Sophomores	66	12.0878 to 13.8819	64	13.4236 to 15.0295
Juniors	33	11.6102 to 13.9656	37	12.5693 to 14.7671
Seniors	32	11.6713 to 13.5475	34	11.7169 to 13.7327
Total	131	12.2699 to 13.4171	135	13.1251 to 14.6628

Table 17 shows that there is not a significant difference in posttest scores between sophomores, juniors, and seniors who did not use AR, unless the pretest score is controlled. (The main effects confidence level is .084.)

TABLE 17

Analysis of Covariance Summary Table
for Verbal Communication Posttest Controlling
for Verbal Communication Pretest
Based on Grade Level of Control Group

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Covariate Pretest	1	80.362	80.362	9.347*
Main Effects AR Use	2	43.037	21.519	2.503
Residual	123	1057.538	8.598	
Total	126	1180.937	9.373	

* Significant at the .01 confidence level (.003)

All grade levels can benefit from using AR. Mean scores on the verbal communication posttest were not outstanding for any of the three grade levels. It appears that it is beneficial to start utilizing AR in sophomore classes and to continue its use through junior and senior classes in order to better prepare seniors to competently communicate in job interviews and on a job. Further research is necessary to determine whether improvement continues at all grade levels with increased exposure to AR or whether skill levels out beyond a particular point. Much improvement is needed in verbal communication skill for BOE students, and it is hoped that AR continues to increase skill as it is used three or more semesters.

Null hypothesis 3 that there is no significant difference in posttest verbal communication skill among sophomores, juniors, and seniors, adjusting for pretest scores on verbal communication skill, was rejected.

Phase Two
Analysis of Verbal Communication Skill
of BOE Students Based on
Sex Controlling for Initial Differences

Null Hypothesis 4. There is no significant difference in the posttest verbal communication skills of males and females, controlling for pretest scores in verbal communication skill.

Since there was only one male in the experimental group, the result of a single-classification analysis of covariance is given for the control group only.

Females were initially superior in verbal communication skill over males, significant at the .01 confidence level. Table 18 gives the summary data for this difference.

TABLE 18

Analysis of Variance Summary Table
for Verbal Communication Pretest
for Control Group
Based on Sex

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Between Groups	1	87.3597	87.3597	8.384*
Within Groups	129	1344.1822	10.4200	
Total	130	1431.5420		

* Significant at the .01 confidence level (.004)

Even when the female group's posttest score is adjusted downward and the male group's upward to take the pretest difference into account, females still are superior in verbal communication skill. Table 19 shows that the adjusted mean for males was 12.88 and for females was 14.18.

TABLE 19
Criterion and Control Variable Means
Based on Sex for Phase Two
for Control Group

Sex	N	Criterion		Control
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill
		Unadjusted	Adjusted	
Female	89	14.29	14.18	13.4045
Male	42	12.66	12.88	11.6548
Total	131	13.75	13.75	12.8435

Table 20 is an analysis of covariance table for the control group showing a significant difference between males and females in verbal communication skill.

TABLE 20
Analysis of Covariance Summary Table
for Verbal Communication Posttest
Controlling for Verbal Communication Pretest
Based on Sex for Control Group

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Covariate Pretest	1	80.362	80.362	9.436*
Main Effect Sex	1	44.511	44.511	5.226**
Residual	124	1056.064	8.517	
Total	126	1180.937	9.373	
* Significant at the .01 confidence level (.00F)				
**Significant at the .05 confidence level (.02F)				

Nothing can really be said about the effect of AR on differences in skill for males and females without an analysis of differences in an experimental group. Only one male was included in the experimental group for phase two of this project. Further research would be necessary to determine whether males overcome an initial disadvantage in communication skill by using AR. It would also be interesting to know how grade level influences the verbal communication progress of boys, since the data presented in the analysis and interpretation of the previous hypothesis 3 is only applicable to girls.

Null hypothesis 4 that there is no significant difference in the posttest verbal communication skills of males and females, controlling for pretest scores in verbal communication skill, was rejected.

Phase Two
Analysis of Verbal Communication Skill
of BOE Students Based on
Class Controlling for Initial Differences

Null Hypothesis 5. There is no significant difference in verbal communication delivery skill among the various selected BOE classes, adjusting for pretest scores on the verbal communication

Referring to Table 21, a one-way analysis of variance table, there was not an initial, significant difference among the seven experimental classes in verbal communication skill. There was also not a significant difference between posttest mean scores of the same classes. However, the classes varied in composition so that a simple comparison could be misleading. For instance, seniors and students with more AR practice usually scored higher than other students on the verbal communication test.

TABLE 21

Analysis of Variance Summary Table
for Verbal Communication Pretest
for Experimental Group
Based on Type of Class

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Among Groups	6	56.1102	9.3517	1.126
Within Groups	120	996.3150	8.3026	
Total	126	1052.4252		

Table 22 shows a single-classification analysis of covariance for the experimental classes. Having used AR during the semester of phase two of this research project, there were significant differences between classes on the verbal communications posttest if pretest scores were controlled.

TABLE 22

Analysis of Covariance Summary Table
for Verbal Communication Posttest Controlling
for Verbal Communication Pretest
Based on Type of BOE Class of Experimental Group

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Covariate				
Pretest	1	84.311	84.311	14.674*
Main Effects				
Class	6	50.827	8.471	1.474
Residual	103	591.785	5.745	
Total	110	726.923	6.608	

* Significant at the .01 confidence level (.001)
The main effects confidence level was .193

Adjusting for pretest verbal communication scores, 18.6 percent of the variation in posttest scores of the experimental group is accounted for by the type of class. Table 23 shows that the three business communications classes scored higher than the shorthand I and careers in business classes when controlling for pretest scores. The adjusted mean of business communications classes ranged from 15.80 to 16.85. Shorthand I class means ranged from 14.88 to 15.54. The careers in business adjusted mean was 14.71.

TABLE 23

Criterion and Control Variable Means
Based on Class for Phase Two
for Experimental Group

Class	N	Criterion		Control	
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill	
		Unadjusted	Adjusted		
Bus. Comm.	08	19	16.91	16.85	12.8158
Shorthand I	09	22	15.42	15.54	12.3864
Shorthand I	10	19	14.66	14.88	12.1842
Shorthand I	11	19	15.45	15.11	13.5789
Bus. Comm.	12	18	15.72	15.80	12.3056
Car. in Bus.	13	14	14.53	14.71	12.0000
Bus. Comm.	14	16	16.16	15.90	13.9375
Total	127		15.57	15.57	12.7402

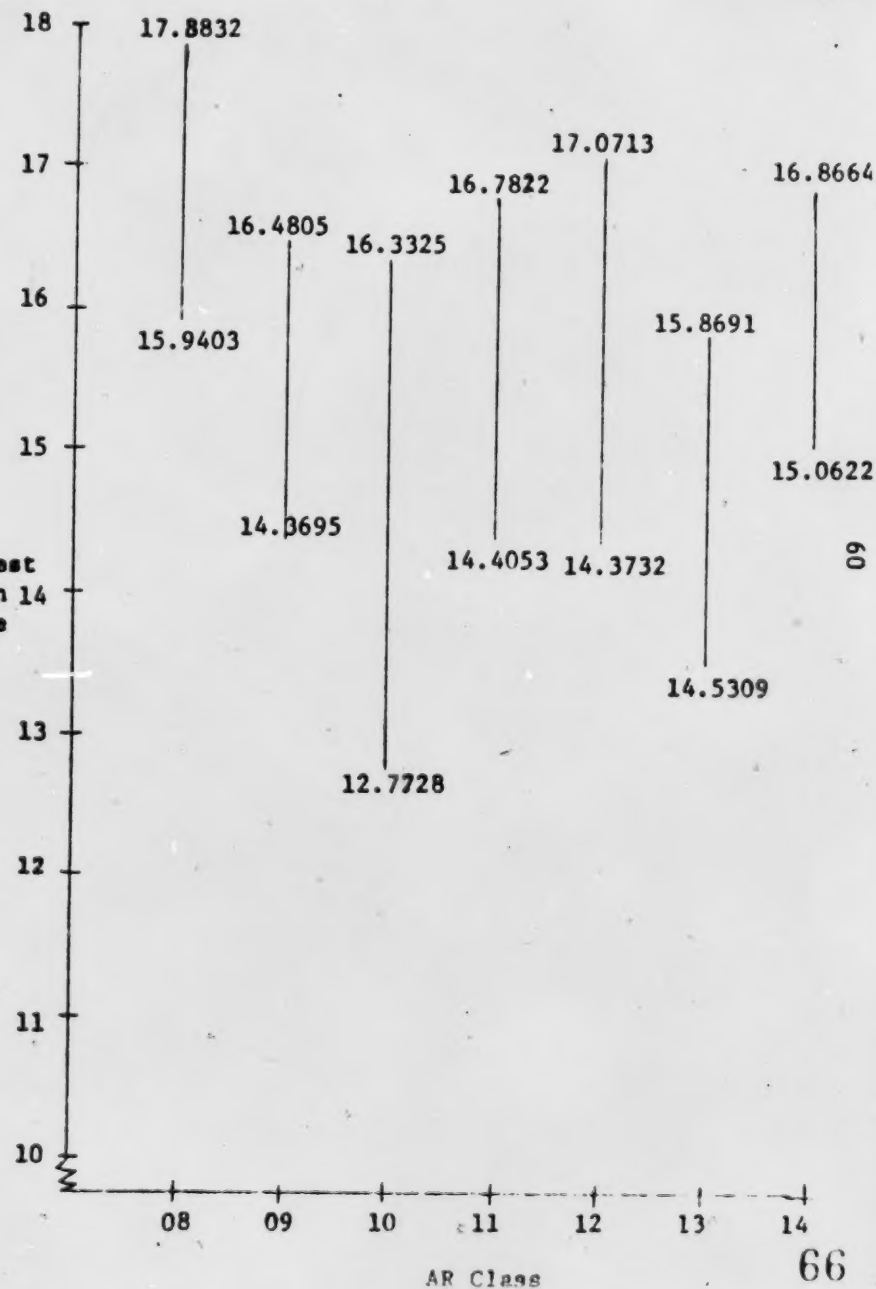
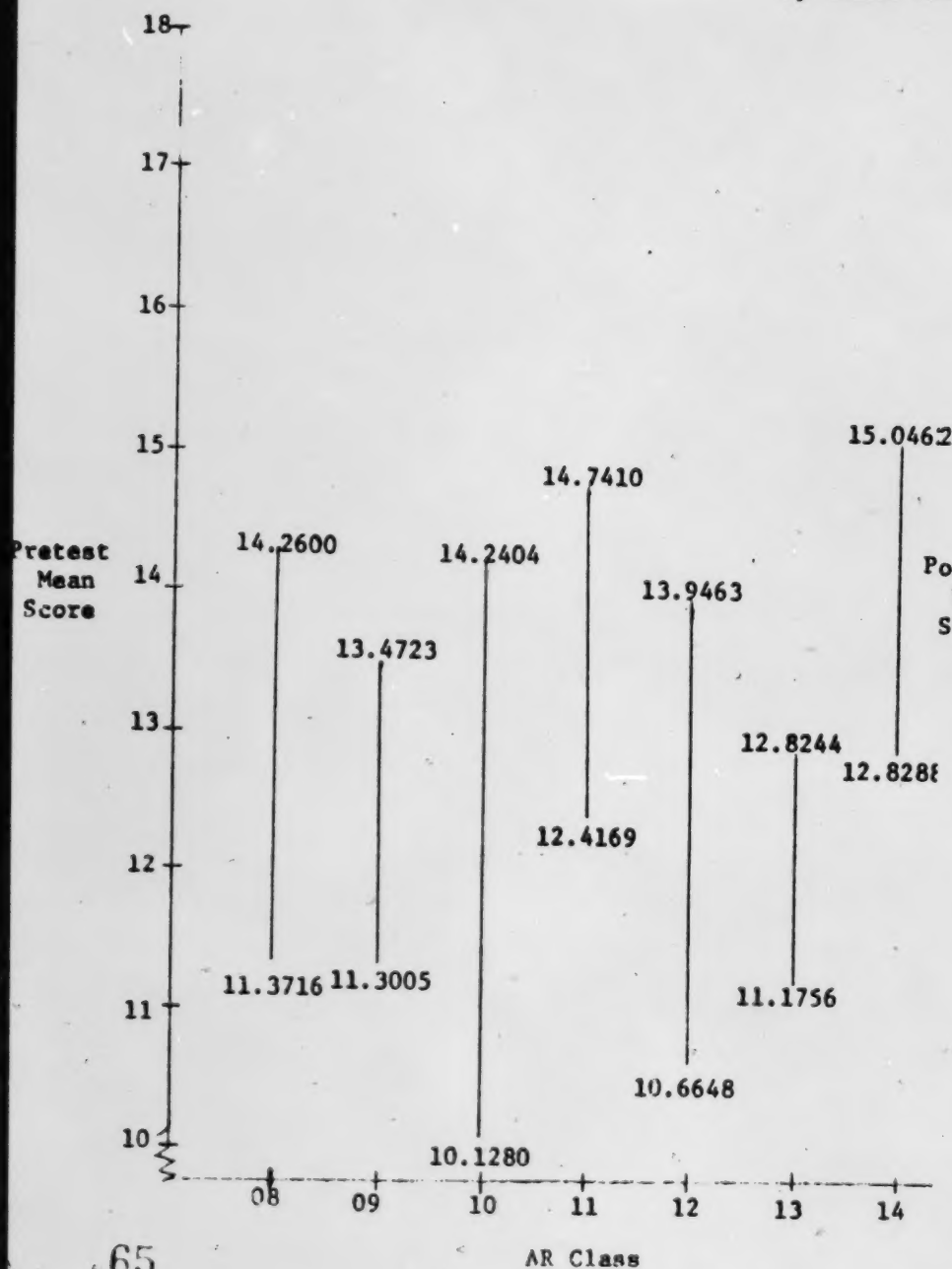
The graphs on page 60 give further information about the effects of AR on various types of classes. They show 95% confidence intervals for mean pretest and posttest scores of experimental classes. The posttest scores are not adjusted for pretest differences. There are no significant differences between classes on the pretest or posttest, as evidenced by the extensive overlapping of confidence intervals.

The three business communications classes (08,12,14) appear to have significantly increased between pretest and posttest scores. Only one shorthand class (09) shows a significant increase, the other two (10,11) do not show significant increases.

Since the business communications classes scored significantly higher than the others when pretest differences were controlled and since they appear to have increased significantly by using AR during the semester, one could safely conclude that AR is an effective teaching tool to improve verbal communication skills in business communication classes. This would correspond with the views of teachers who used AR. Teachers felt AT adapted well to business communications classes. Although verbal aspects of communicating are not specifically covered in the classes, except through the use of AR, other content may have indirectly contributed to increased verbal communication skill.

Teachers felt that AR did not adapt as well to skill classes such as shorthand. Thus, perhaps AR was not used as much or as effectively in those classes. Since one of the shorthand classes appears to have significantly increased scores between the pretest and posttest, differences in teacher effectiveness might also need to be considered.

GRAPTM
 95% Confidence Intervals for Means of Pretest and Posttest
 on Verbal Communication Skill for Experimental Group
 by Class for Phase Two



Although the careers in business class had a significantly lower mean posttest score when pretest scores were controlled, the class still appears to have significantly increased scores between the pretest and posttest. Teachers felt the careers in business class adapted well to AR. The lower ranking could be explained by the fact that sophomores and students with only one semester of AR constituted the class. These were shown to score lower than juniors, seniors, and students with two semesters of AR.

There are other BOE classes which would adapt well to AR and which would likely benefit students by adding interest and variety to the subject matter taught, as well as improve verbal communication skills. Classes which adapt well to AR are ones with lecture techniques, reading, class discussion, and written assignments which can be verbalized. Business law and economics classes seem especially appropriate, in addition to communications and exploratory courses included in this study. Filing and record keeping, cooperative clerical and secretarial classes, work processing, and accounting are potential AR users for selected portions of the curriculum. There are also uses for AR in the beginning weeks of shorthand I when students are phonetically sounding out words, reading shorthand, and drilling theory and brief forms. AR is also useful in any classes which utilize individualized activities or independent study.

The pretest, unadjusted posttest, and adjusted posttest means for verbal communication skill of the control classes are shown in Table 24.

TABLE 24
Criterion and Control Variable Means
Based on Class for Phase Two
for Control Group

Class	N	Criterion		Control
		Posttest Verbal Communication Skill		Pretest Verbal Communication Skill
		Unadjusted	Adjusted	
Typing I 01	14	17.04	16.95	14.1071
Typing I 02	21	16.26	16.18	13.9762
Fil. & Rec. 03	16	13.22	13.30	11.8125
Typing I 04	25	11.42	11.60	10.3000
Typing I 05	23	12.65	12.65	12.8696
Typing II 06	22	12.18	12.09	14.1591
COE 07	10	16.10	16.04	13.7500
Total	131	13.75	13.75	12.8435

The 95% confidence intervals for the means of the pretest of verbal communication skill for each control class are given in Table 25. Only the typing control class number 01 appeared to have significantly increased verbal communication skill between the pretest and posttest. This class consisted of 8 sophomores, 6 juniors, 4 males, and 10 females. I cannot explain why an increase would result. There was considerable overlap in the mean confidence intervals for the other control classes, indicating that more than likely no significant increase took place between the pretest and posttest.

TABLE 25

95% Confidence Intervals
for Mean Score on Verbal Communication
Pretest and Posttest of Control Group
Based on Class

Class		Pretest 95% c.i.	Posttest 95% c.i.
Typing I	01	12.2948 to 15.9195	16.2639 to 17.8076
Typing I	02	12.8191 to 15.1333	14.8504 to 17.6734
Fil. & Rec.	03	9.7767 to 13.8483	12.5566 to 14.1493
Typing I	04	8.8676 to 11.7324	10.6858 to 12.0285
Typing I	05	11.6135 to 14.1256	11.4663 to 13.5337
Typing II	06	12.8913 to 15.4269	10.8882 to 13.4618
COE	07	12.3469 to 15.1531	14.8071 to 17.3929

Null hypothesis 5 that there was no significant difference in verbal communication delivery skill among the various selected BOE classes, adjusting for pretest scores on the verbal communication skill was rejected.

Phase Two
Analysis of Increase in Verbal
Communication Skill of BOE Students
Between Pretest, Midtest, and Posttest

Null Hypothesis 6. There was no significant improvement between the pretest and midtest or between the midtest and posttest of verbal communication skill for the experimental group.

The same verbal communication instrument used for the pretest and posttest were also used for a test in the middle of the semester, referred to as a midtest. The midtest was administered to the experimental group in order to determine where progress took place in verbal communication skill during the duration of the semester.

Two correlated t-tests were used to analyze null hypothesis 6. Table 26 shows the t-test between the pretest and midtest of verbal communication skill for the experimental group. Table 27 shows the t-test between the midtest and posttest.

TABLE 26

T-test Summary Table
Comparing Pretest and Midtest
Verbal Communication Skill for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	114	12.6667	2.908	-6.22*
Midtest		14.6272	2.958	

* Significant at greater than the .01 level (.0001)

TABLE 27

T-test Summary Table
Comparing Midtest and Posttest
Verbal Communication Skill for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Midtest	112	14.5982	2.888	-3.37*
Posttest		15.5759	2.531	

* Significant at greater than the .01 level (.0001)

During the first part of the semester, students were learning to utilize the AR equipment and were probably motivated to improve their vocal delivery by this new technique of learning. Students who used AR showed a significant improvement at the .01 confidence level in verbal communication skill within the first nine weeks of the semester.

By the second half of the semester, students had become quite efficient in using AR and were more comfortable in verbally communicating. They significantly improved at the .01 confidence level verbal communication skill during the last half of the semester.

AR users continually improve throughout the semester. Evidently, the benefit of AR in improving verbal communication skill is realized in a relatively short period of time. In nine weeks, with less than 10 percent of the class time used for AR, significant improvements had already taken place. Thus, AR could probably be used for specific units within a course and still improve verbal communication skill some.

Null hypothesis 6 that there was no significant improvement between the pretest and midtest or between the midtest and posttest of verbal communication skill for the experimental group was rejected.

Phase Two Analysis of Relationship Between Ratings of Evaluators

Null Hypothesis 7. There was no significant correlation between the verbal communication ratings of teacher, self, peer, or an average of self and peer. Pearson correlations were used to analyze these relationships.

A student's response to a question was recorded on the AR equipment so that it could be evaluated for verbal communication ability by the student, a peer student, and the teacher. An average of the self and peer ratings was used for analyzing improvement.

Table 28 shows the pretest mean scores for experimental and control groups according to the evaluator--self, peer, teacher, or average of self and peer. Table 29 shows the same for the posttest. The self scores were approximately 2 points lower than the peer scores. Pretest teacher scores were the lowest, approximately 1 point below self scores and 3 points below peer scores. Posttest teacher scores were between the self and peer scores.

TABLE 28

Mean Pretest Verbal Communication Scores
by Type of Evaluator

Evaluator	Experimental Mean Score	Control Mean Score
Teacher	10.114	10.677
Self	11.158	11.939
Peer	13.937	13.664
Average of Self & Peer	12.740	12.844

Table 29
Mean Posttest Verbal Communication Scores
by Type of Evaluator

Evaluator	Experimental Mean Score	Control Mean Score
Teacher	15.364	13.130
Self	14.933	12.667
Peer	16.168	14.593
Average of Self & Peer	15.538	13.644

The ratings of all the evaluators were highly correlated for the control group, as seen in Table 31. All but two of the evaluators' scores significantly correlated at the .01 confidence level for the experimental group, as shown in Table 30. The teacher scores did not significantly correlate with the peer scores or the average of self and peer for the experimental group. Using an average of the self and peer scores appears to have been a reliable assessment of verbal communication skill.

TABLE 30

Pearson Correlation Summary Table
Comparing Verbal Communication Scores
of Teacher, Self, Peer, and Average of Self and Peer
for Experimental Group

Relationship	Correlation	
	Pretest	Posttest
Teacher versus Self	$r = .5280^*$	$r = .5266^{**}$
Teacher versus Peer	$r = .2498$	$r = .3990$
Teacher versus Average Self/Peer	$r = .4791^*$	$r = .4881$
Self versus Peer	$r = .4424^*$	$r = .4195^*$
Self versus Average Self/Peer	$r = .8501^*$	$r = .8402^*$
Peer versus Average Self/Peer	$r = .8475^*$	$r = .8422^*$

* Significant at the .01 confidence level

**Significant at the .05 confidence level

TABLE 31

Pearson Correlation Summary Table
 Comparing Verbal Communication Scores
 of Teacher, Self, Peer, and Average of Self and Peer
 for Control Group

Relationship	Correlation	
	Pretest	Posttest
Teacher versus Self	$r = .4410^*$	$r = .6989^*$
Teacher versus Peer	$r = .4893^*$	$r = .5710^*$
Teacher versus Average Self/Peer	$r = .5316^*$	$r = .7140^*$
Self versus Peer	$r = .5452^*$	$r = .5302^*$
Self versus Average Self/Peer	$r = .8528^*$	$r = .8838^*$
Peer versus Average Self/Peer	$r = .8886^*$	$r = .8646^*$

Null hypothesis 7 that there was no significant correlation between the verbal communication ratings of teacher, self, peer, or an average of self and peer was rejected.

IV. FINDINGS AND
INTERPRETATION

Phase Three

IV. FINDINGS AND INTERPRETATION

Phase Three

Phase three took place during the second semester of the 1975-76 school year. Findings were considered significant at the .05 level of confidence. The .01 level was also reported.

Phase Three

A pretest was administered to a control group and experimental group of Northglenn High School BOE students during the first week of the semester. A posttest was administered to both groups during the last week of the same semester. The experimental group consisted of 20 students in a careers in business class who used AR for the semester and had no previous experience with it. The control group consisted of 22 students in a typing I class who did not use AR and had no previous experience with it. The same teacher taught both classes.

Student verbal communication skill was measured on the pretest and posttest by two trained evaluators, whose evaluations were averaged together. They rated a student's response to a question similar to one which might be asked in a job interview. The rating instrument consisted of eleven items rated on a scale with five degrees. The verbal communication instrument is shown on page 152. It measured content, organization, use of language, and delivery.

Phase Three
Analysis of Increase in Verbal
Communication Skill of BOE Students

Null Hypothesis 1. There is no significant increase between pretest and posttest of groups in verbal communication skill. A t-test was used to compare the pretest and posttest of verbal communication skill for the experimental group. Results were compared to a control group. A correlated t-test was used.

Table 1 shows mean verbal communication scores for experimental and control classes. The mean score represents the average of ratings by trained evaluators on an 11-item instrument measuring verbal communication skill of students. Each item is rated on a scale of 1 to 5 so that 55 total points are possible. Having used AR for one semester, the experimental class increased 2.7763 points between the mean pretest and mean posttest scores measuring verbal communication skill. The control class did not use AR and showed less gain, .8298 points, between the mean pretest and mean posttest scores.

TABLE 1

Verbal Communication Mean Scores and Gains
for Experimental and Control Groups

Group	N	Pretest Mean	N	Posttest Mean	Gain
Experimental	19	25.4737	16	28.2500	2.7763
Control	21	27.0952	20	27.9250	.8298

When analyzing the gain between pretest and posttest scores to determine whether or not it is a significant gain, pairs are deleted which have missing data. Table 2 shows that when some cases are deleted, the gain for the experimental class is not as great as in Table 1; and the control class gain is much greater than in Table 1.

TABLE 2

Verbal Communication Mean Scores and Gains
for Experimental and Control Groups
with Pairwise Deletion of Missing Data

Group	N	Pretest Mean	N	Posttest Mean	Gain
Experimental	15	26.1000	15	27.9333	1.8333
Control	19	26.8947	19	28.8158	1.9211

Tables 3 and 4 show the t-tests for experimental and control groups respectively, comparing the pretest with the posttest measuring verbal communication skill. There was no significant difference for either group.

The instrument measuring verbal communication skill included content and delivery aspects. One semester is not a very long time to improve something as complex as verbal communication skill, especially since the emphasis in the class was careers in business and not communications. AR was just a teaching technique periodically used to teach careers in business subject matter. AR was used for only 11 days out of the 18 weeks, which is approximately 10 percent of the class time.

It is possible that improvement in verbal communication skill takes place as AR is used in more classes throughout a student's high school years. Since mainly sophomores were included in this research design,

effects of grade level could not be analyzed. Juniors and seniors may see the relevance and benefit of good verbal communication for job interviews and business and office jobs, thus gaining more from the AR experience.

TABLE 3

T-test Summary Table
Comparing Pretest and Posttest
Verbal Communication Skill for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	15	26.1000	4.638	-1.22
Posttest		27.9333	4.325	

TABLE 4

T-test Summary Table
Comparing Pretest and Posttest
Verbal Communication Skill for Control Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	19	26.8947	4.280	-1.62
Posttest		28.8158	3.952	

Table 5 shows that there is much room for improvement in verbal communication skill. On a scale from one to five, for which one shows the lowest verbal communication rating and five the highest, students scored about two on the average.

TABLE 5

Mean Item Score of Pretest and Posttest
for Verbal Communication Skill
of Experimental and Control Groups

	Mean Item Score	
	Experimental	Control
Pretest	2.316	2.463
Posttest	2.568	2.539

Null hypothesis 1 that there is no significant increase between the pretest and posttest of groups in verbal communication skill was accepted.

Phase Three
Analysis of Decrease in
Superiority and Intolerance of BOE Students

Null Hypothesis 2. There is no significant decrease between pretest and posttest of groups in superiority and intolerance. A t-test was used to compare the pretest and posttest of superiority and intolerance for the experimental group. Results were compared to a control group.

Tables 6 and 7 show the t-tests for experimental and control classes comparing the pretest with the posttest measuring superiority and intolerance. There is no significant difference in pretest and posttest scores. A correlated t-test was used.

TABLE 6

T-test Summary Table
Comparing Pretest and Posttest
Superiority and Intolerance for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	17	26.7059	7.687	-.15
Posttest		27.0000	6.973	

TABLE 7

T-test Summary Table
Comparing Pretest and Posttest
Superiority and Intolerance for Control Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	21	23.9048	3.604	1.52
Posttest		22.4286	4.354	

Mean scores on superiority and intolerance represent the average of a student's own ratings on a 12-item subscale of a self-appraisal inventory. Each item is rated on a scale of 1 to 5, so that total scores can range from 5 to 60. The higher the score, the more superiority and intolerance.

Tables 8 and 9 show that males are significantly more superior and less tolerant of others. This is true for the pretest and remains true for the posttest in the experimental group. Since there were only two males in the control group, differences by sex were not analyzed. When the experimental and control classes are combined, these findings between males and females remain significant, as seen in table 10. A pooled-variance t-test was used to compare tests by sex.

TABLE 8

T-test Summary Table
Comparing Males and Females on Pretest of
Superiority and Intolerance for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Male	8	32.2750	6.479	3.86*
Female	12	22.3333	5.140	

* Significant at greater than the .01 level (.001)

TABLE 9

T-test Summary Table
Comparing Males and Females on Posttest of
Superiority and Intolerance for Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Male	7	31.1429	4.140	2.31*
Female	10	24.1000	7.233	

* Significant at the .05 confidence level (.035)

TABLE 10

T-test Summary Table
Comparing Males and Females on Pretest of
Superiority and Intolerance for Combined Group

Variable	N	Mean Score	Standard Deviation	T Value
Male	10	31.2000	4.011	4.47*
Female	32	23.4348	4.326	

* Significant at greater than .01 confidence level (.0001)

The males decreased superiority and intolerance with a pretest mean score of 32.2750 and a posttest mean score of 31.1429. Females

increased superiority and intolerance with a pretest mean score of 22.3333 and a posttest mean score of 24.1000. However, males were significantly more superior and intolerant than females on the pretest and posttest.

Table 11 shows the average rating for items dealing with superiority and intolerance. Students generally replied that they "mostly disagree" with statements such as "I feel that I am better than most people," and "I don't like people whose beliefs and values are different than mine."

TABLE 11

Mean Item Score of Pretest and Posttest
for Superiority and Intolerance
of Experimental and Control Groups

	Mean Item Score	
	Experimental	Control
Pretest	2.20	2.02
Posttest	2.25	1.87

Null hypothesis 2 that there was no significant decrease in scores of superiority and intolerance of those who used AR was accepted.

Phase Three Analysis of Decrease in Shyness of BOE Students

Null Hypothesis 3. There is no significant decrease between pretest and posttest in shyness. A correlated t-test was used to compare the pretest and posttest of shyness for the experimental group. Results were compared to a control group.

Tables 12 and 13 show the t-tests for experimental and control classes comparing the pretest with the posttest measuring shyness.

TABLE 12

T-test Summary Table
Comparing Pretest and Posttest
Shyness of Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	17	31.0588	7.790	.54
Posttest		30.2353	6.047	

TABLE 13

T-test Summary Table
Comparing Pretest and Posttest
Shyness of Control Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	21	30.8571	6.207	2.41*
Posttest		28.1429	5.773	

* Significant at the .01 confidence level

Shyness decreased whether AR was used or not, but significantly for the control class. The confidence level for the t value of the experimental class was .299 and for the control class was .013. It appears that shyness decreases over time with maturity or with learning.

I feel that there is a possibility that because students in the experimental class verbally communicated more, they were more aware of the risks involved in talking and having others hear what they said. Therefore, they may have felt the difficulties of dealing with shyness more than a typing class where a minimum amount of class discussion takes place.

Mean scores on shyness represent the average of students' own ratings on a 10-item subscale of a self-appraisal inventory. Each item is rated on a scale of 1 to 5, so that total scores can range from 5 to 50. The higher the score, the more shyness.

Item analysis table 14 shows the average rating for items dealing with shyness. Students generally replied that they "agree as much as disagree" with statements such as, "When I'm in a group, I usually don't say much for fear I will say the wrong thing."

TABLE 14
Mean Item Score of Pretest and Posttest
for Shyness
of Experimental and Control Groups

	Mean Item Score	
	Experimental	Control
Pretest	3.10	3.08
Posttest	3.02	2.81

Null hypothesis 3 that there was no significant decrease in pretest and posttest scores of shyness for those students who used AR for one semester was accepted.

Phase Three Analysis of Increase in Participation in Class of BOE Students

Null Hypothesis 4. There was no significant increase between the pretest and posttest scores of verbal participation in class of those students who used AR for one semester. A correlated t-test was used to

compare the pretest and posttest of verbal participation in class for the experimental group. Results were compared to a control group.

Tables 15 and 16 show the t-tests for experimental and control classes respectively comparing the pretest with the posttest measuring verbal participation in class.

TABLE 15

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Experimental Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	17	16.7647	5.274	-1.81*
Posttest		18.1176	5.061	

*Significant at the .05 confidence level (.0445)

TABLE 16

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Control Group

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	21	16.0000	5.376	-1.28
Posttest		16.8571	5.209	

The confidence level for the t value for the experimental group was .0445 and for the control group was .1075. There was a significant increase in verbal participation in class for the experimental group which used AR for one semester. There was not a significant increase for the control group.

Mean scores on verbal participation in class represent the average of students' own ratings on a 6-item subscale of a self-appraisal inventory. Each item is rated on a scale of 1 to 5, so that total scores can range from 5 to 30. The higher the score, the more verbal participation in class.

Students have the opportunity to talk more in an AR class and may thus feel more comfortable participating in class. I feel this is a great advantage to using AR. Based on my experience as a high school BOE teacher, I feel teachers often talk too much. Some of the same learning would take place if students were encouraged to talk more. In addition, students would be gaining valuable practice in verbally communicating. AR is an excellent tool for enabling students to talk more.

Table 17 shows an item analysis of average ratings for items dealing with verbal participation in class. Students generally replied that they "agree as much as disagree" with statements such as, "I enjoy taking part in class discussions."

TABLE 17

Mean Item Score of Pretest and Posttest
for Verbal Communication in Class
of Experimental and Control Groups

	Mean Item Score	
	Experimental	Control
Pretest	2.80	2.66
Posttest	3.02	2.81

A differentiation in verbal participation in class by level of initial verbal communication skill was found for the experimental group. The experimental and control classes were divided into two groups, those scoring in the top half of the class on the pretest of verbal communication skill and those scoring in the bottom half.

Table 18 shows a significant increase at the .05 confidence level between the pretest and posttest on verbal participation in class for the experimental students who initially scored higher in verbal communication skill. Table 19 shows no significant increase for the control group (.519 probability level). Tables 20 and 21 give the correlated t-tests showing no significant differences for the students who initially had lower verbal communication skill (.737 probability for the experimental group and .257 for the control group).

TABLE 18

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Experimental Group
Who Scored in Top Half on Verbal Communication Pretest

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	10	15.3000	5.658	-1.96*
Posttest		17.2000	5.653	

* Significant at the .05 confidence level (.041)

TABLE 19

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Control Group
Who Scored in Top Half on Verbal Communication Pretest

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	9	15.8889	6.333	-.67
Posttest		16.7778	6.037	

TABLE 20

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Experimental Group
Who Scored in Bottom Half on Verbal Communication Pretest

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	6	19.0000	4.561	-.36
Posttest		19.5000	4.506	

TABLE 21

T-test Summary Table
Comparing Pretest and Posttest
Verbal Participation in Class of Control Group
Who Scored in Bottom Half on Verbal Communication Pretest

Variable	N	Mean Score	Standard Deviation	T Value
Pretest	11	16.1818	5.056	-1.20
Posttest		17.0909	4.969	

Students who started out with slightly better communication skills, increased their participation in class if AR was used. It is possible that those scoring in the bottom half of the class in verbal communication skill would require more time to be skilled and confident enough to

participate more in class. Increased verbal communication skill might increase their verbal participation in class over an extended period of time.

Null hypothesis 4 that there was no significant increase between the pretest and posttest scores of verbal participation in class of those students who used AR for one semester was rejected.

V . F I N D I N G S A N D
I N T E R P R E T A T I O N
Q U E S T I O N N A I R E S , R E P O R T S , C U R R I C U L U M
P h a s e s T w o a n d T h r e e

V. FINDINGS AND INTERPRETATION

Questionnaires, Reports, Curriculum Phases Two and Three

Student Questionnaire. At the end of the semester, students who had used AR filled out a student questionnaire. It was used to determine how students felt about using AR and about its benefit to them. A sample is included on page .

In general, students rated AR on the positive half of the rating scale. Each item was ranked on a scale of 1 to 5 from "completely disagree" to "completely agree" with a stated benefit of AR. The higher the score, the more benefit of AR. The average item rating was 3.348.

I feel that students would increasingly see value in using AR with greater exposure to it. In such a short time and with limited use students wouldn't see much improvement in their verbal communication skills or confidence in them. Therefore, they wouldn't see the real potential of AR.

Table 1 shows an analysis of the average rating for each item of the student questionnaire filled out by the careers in business class of phase three.

TABLE 1

Student Questionnaire
Item Analysis
Phase Three

Rank	Item	Mean Item Score
1st	2	3.71
2nd	9	3.47
2nd	10	3.47
3rd	8	3.41
4th	7	3.35
5th	1	3.29
5th	5	3.29
6th	3	3.24
6th	6	3.24
6th	11	3.24
7th	4	3.12

In general, the highest rating (3.71) was given for item 2, which stated that the use of AR helped a student speak up more and talk more clearly. This would agree with findings that the experimental classes significantly improved their verbal participation in class.

Items 9 and 10 tied for second place. Item 9 and 10 stated that the use of AR helped a student carry on conversations with others better and be more independent, respectively. If students feel they can carry on a conversation better, hopefully they would feel more confident in a job interview situation, which is one of the ultimate purposes of this study. As students confirmed, AR is especially useful for independent study or individualized instruction.

Item 8 was the third highest rated item, which stated that the use of AR helped a student be a more careful listener. Although listening skills were not measured, this is an important aspect of verbal communication skill. Perhaps, further study of this aspect would be beneficial.

The fourth highest rated item was item 7, stating that the use of AR helped a student enjoy the class more. Even if AR does not greatly improve verbal communication skill or confidence in communicating of a particular student, I feel that AR is a valuable teaching tool to motivate most students and increase their involvement in the class. In spite of the fact that students were required to talk more in class, which might be a somewhat painful experience for shy students, they still felt that it helped them enjoy the class more.

Table 2 summarizes mean scores on the student questionnaire for phases two and three. Breakdowns are given by BOE class, grade level, and AR use. The mean total score, and mean item score are shown.

TABLE 2

Mean Score Broken Down by
Grade Level and AR Use
Phases Two and Three

Class**	Mean Total Score	Mean Item Score	Soph.	Jr.	Sr.	AR1*	AR2*
Shorthand I 09	36.72	3.34	31.00	36.75	36.50	39.58	31.00
Shorthand I 10	28.15	2.56	--	27.84	34.00	28.35	27.00
Shorthand I 11	29.24	2.66	--	29.24	--	26.00	39.75
Car. in Bus. 13	36.73	3.34	36.73	--	--	36.73	--
Bus. Commun. 14	29.73	2.70	--	33.00	26.18		--
Car. in Bus. 15	36.82	3.35	36.54	36.00	38.33	36.82	--
Total	32.56	2.96	35.65	31.48	30.00	33.41	32.77

* AR1 represents the mean questionnaire score for students who used AR for 1 semester. AR2 represents 2 semesters of AR use.

**Classes 08 - 14 were phase two. Class 15 was phase three.

AR was most effective and liked by sophomores; least by seniors. The mean score for sophomores was 35.65, for juniors was 31.48, and for seniors was 30.00. I have found that sophomores are many times more receptive to new ideas. They are experiencing their first year in high school and may thus be more open to changes and variations in teaching techniques.

AR was slightly more effective and accepted by students who had used it more than one semester. The mean score for those who used AR one semester was 33.41. The mean score for those who used AR for two semesters was 32.77.

Careers in business and one of the shorthand classes rated AR higher than the business communications and other shorthand classes. This could be a factor of how well AR adapted to the type of class and also how effective the teacher was in using AR. It was found that careers in business adapted well to AR and students saw greater benefit in its use in those classes.

The next page describes the teacher questionnaire, which rated the teacher's attitude towards the benefits of AR to themselves and students. As Table 3 shows, there may be some correlation between teacher attitudes towards AR and how students rated AR. The teachers who had the three highest teacher questionnaire scores taught classes where students had the highest student questionnaire scores.

TABLE 3

Student and Teacher Questionnaire
Mean Scores by Class
Phases Two and Three

Class	Student Mean Score	Teacher Mean Score
Car. in Bus. 15	36.82	36
Car. in Bus. 13	36.73	35
Shorthand I 09	36.72	31
Bus. Commun. 14	29.73	31
Shorthand I 11	29.24	23
Shorthand I 10	28.15	31

Teacher Questionnaire. The teachers who participated in this study completed a teacher questionnaire at the end of each semester. They are included in this report since I feel their comments are extremely valuable due to their firsthand experience with using AR. (See Appendix

AR is not only beneficial to students but also to teachers. A sample teacher questionnaire is included on page . An item analysis is shown in Table 4 in rank order.

TABLE 4

Teacher Questionnaire
Item Analysis in Rank Order
Phases Two and Three

Rank	Item	Mean Item Score
1st	1	3.67
1st	10	3.67
2nd	4	3.33
3rd	7	3.17
3rd	8	3.17
4th	2	2.83
4th	3	2.83
4th	5	2.83
4th	6	2.83
4th	9	2.83

The mean item score represents a rating from 1 to 5 indicating the degree of agreement or disagreement with stated teacher and student benefits of AR. The higher the score, the more benefit of AR. The overall mean item score was 3.12. The mean total score for 10 items was 31.17.

The highest rated items stated that the use of AR helped vary instruction methods and techniques and helped the students be more careful listeners. The benefit of AR in improving listening skills was rated high by students also.

The second highest rating was given for the statement that the use of AR helped get better participation from shy students who otherwise might not have contributed. Although a statistical correlation was not analyzed between a student's shyness and participation in class, the teachers felt that they saw improvement in very shy students. AR does force all students to talk more so that shy students would more than likely participate more in a class which used AR. Hopefully, with practice, shy students' participation would increase in all their classes.

The third highest ratings were for AR helping students learn certain material better or easier and helping students to be more independent. Data has not been gathered on how AR relates to learning in BOE classes. The technique is well suited to certain types of learning such as drills in shorthand theory, spelling, and job interview preparation. Students who learn best from listening and talking rather than visual stimuli, would find AR a useful study technique. Teachers probably felt students could be more independent when using AR because students can respond in class and proceed on assignments individually at their own rate without waiting on the others in the class.

Teacher Reporting Form. A summary of the time spent using AR in class and preparing for its use is shown in Table 5.

TABLE 5
Teacher Report Summary
Phases Two and Three

Class	% of Class Time Used for AR	% of Planning Time Used for AR Planning
Bus. Commun. 08	7.03	7.81
Shorthand I 09	4.87	5.31
Shorthand I 10	5.01	4.38
Shorthand I 11	8.39	0.00
Bus. Commun. 12	8.39	0.31
Car. in Bus. 13	8.39	3.44
Bus. Commun. 14	10.82	3.44
Car. in Bus. 15	10.00	4.38
Total	7.86	3.63

Approximately 8% of the total class time was spent using the AR teaching technique. It was used a little less than once each week. It is generally agreed by teachers who have used AR that the use would be greatly increased in classes that adapt well to AR if the AR equipment could remain set up. Because of scheduling and limited facilities, this has not been possible at Northglenn High School. The time and inconvenience of setting up the AR equipment make short assignments for part of a class period infeasible.

However, even limited use does seem to have enough benefits to recommend its use. Based on the gains that are made in verbal communication skill in a relatively short period of time and based on the great need for improved skill by high school students, any extra class time or planning time used for AR is well spent.

AR Curriculum. Additional curriculum materials and ideas were generated by teachers in adapting AR to the various types of BOE classes. I am collecting curriculum ideas and materials from all phases of this study in order to integrate them into a comprehensive curriculum guide for BOE classes which use AR.

VI . SUMMARY

Phase Two

VI. SUMMARY

Phase Two

This study was conducted during the first semester of the 1975-76 school year for the following purposes:

1. To determine the degree of verbal communication skill possessed by selected BOE students at the beginning and at the end of enrollment in a one-semester course which used AR, thus determining the degree of improvement.
2. To develop a valid and reliable pretest and posttest to measure verbal communication skill.
3. To determine if differences in verbal communication skill exist among sample students who differ in selected factors such as sex, grade level, number of semesters of AR use, and type of BOE class.
4. To determine the effectiveness of AR for improving verbal communication skill for students who differ in selected factors listed above.
5. To determine whether significant gains in verbal communication skill take place after using AR for nine weeks and whether continued use for another nine weeks continues to increase verbal communication skill.
6. To determine the feasibility of using AR in selected BOE classes.
7. To determine student and teacher attitudes towards using AR.
8. To develop curriculum materials adaptable to BOE courses.

A pretest was administered to 275 Northglenn High School business and office education (BOE) students during the first week of the first semester of the 1975-76 school year. A posttest was administered during the last week of the same semester. One group (136 students) was designated an experimental group and used AR. The other group (139 students) served as a control group who did not use AR. The same teacher was matched to a control and experimental group.

Student verbal communication skill was measured on the pretest and posttest by a self and peer evaluation, averaged together. In addition, the experimental group's verbal communication skill was assessed midway through the semester. The verbal communication instrument emphasized delivery aspects.

Null Hypothesis 1. A significant difference in verbal communication skill at greater than the .01 confidence level was found among students who had used AR for zero, one, and two semesters. Table 3 of Section III shows that students using AR for two semesters had the highest posttest score and the highest gain in verbal communication skill. The control group with zero semesters of AR use had the lowest posttest mean score and improved the least. There were no significant differences among pretest mean scores of the three groups. The graph on page 60 shows confidence intervals for the means of the three groups on the pretest and posttest, indicating that students significantly increased verbal communication skill after using AR for one or two semesters.

Null Hypothesis 2. Single classification analysis of covariance showed a significant difference in the verbal communication skill at greater than the .01 confidence level among students who had used AR for zero, one, and two semesters, controlling for pretest differences in

verbal communication skill. Table 9 of Section III revealed that the adjusted posttest mean score for the control class was lowest. It was highest for the group of students who had used AR for two semesters.

Null Hypothesis 3. Single-classification analysis of covariance revealed significant differences in verbal communication skill at greater than the .01 confidence level among sophomores, juniors, and seniors, adjusting for initial differences in pretest verbal communication skill. Table 12 of Section III shows the experimental group adjusted posttest mean scores, of which the senior group was highest and the sophomore group was lowest. The confidence intervals for the mean pretest and posttest scores shown in Table 13 of Section III suggest significant increases in verbal communication skill for all three grade levels of the experimental group.

Null Hypothesis 4. Single-classification analysis of covariance showed significant differences in verbal communication skill at greater than the .01 confidence level between posttest scores for males and females, controlling for pretest differences in verbal communication skill of the control group. Only the control group could be analyzed by sex because only one male was included in the experimental group. Therefore, effects of AR on verbal communication skill of males and females comparatively could not be analyzed. However, it was established that males initially show lower verbal communication skill than females, as shown in Table 19 of Section III.

Null Hypothesis 5. There were significant differences in verbal communication skill at greater than the .01 confidence level among the seven BOE experimental classes, controlling for pretest differences in verbal communication skill. A single-classification analysis of covariance was used to analyze class differences. Table 24 of Section III shows that

the adjusted posttest mean scores for business communication classes were highest. Shorthand I classes were next in line, and the careers in business class was lowest. The graph on page shows confidence intervals for pretest and posttest means. Lack of overlap between pretest and posttest confidence intervals for the business communication and careers in business classes suggests that significant increases were probable in those classes. This was not true for two of the three shorthand I classes.

Null Hypothesis 6. The t-test was used to determine whether significant differences in verbal communication skill existed between the pretest and midtest (beginning and middle of semester) and also between the midtest and posttest for students who used AR during the semester of phase three. There was a significant difference at greater than the .01 confidence level between the students' pretest and midtest scores and also between midtest and posttest scores on verbal communication skill.

Null Hypothesis 7. A pearson correlation was used to determine whether teacher, self, peer, and average of self and peer evaluations of verbal communication skill were correlated. It was found that all except the pretest peer with self and peer with the averaged evaluations did correlate at the .05 confidence level. Tables 28 and 29 of Section III indicate that self evaluations of skill were generally lower than peer evaluations, with teacher evaluations lower than both on the pretest but between the two on the posttest.

VII. SUMMARY

Phase Three

VII. SUMMARY

Phase Three

Phase three of this study was conducted during the second semester of the 1975-76 school year for the following purposes:

1. To determine the degree of verbal communication skill possessed by selected BOE students at the beginning and at the end of enrollment in a one-semester course which used AR.
2. To compare semester changes in verbal communication skill of an experimental class which used AR and of a control class which did not.
3. To develop valid and reliable tests to measure verbal communication skill and affective areas, such as verbal participation in class, shyness, and superiority and lack of tolerance for others.
4. To determine the degree of verbal participation in class, shyness, and superiority or lack of tolerance of selected BOE students at the beginning and at the end of enrollment in a one-semester course which used AR.
5. To compare semester changes in confidence in verbally participating in class, shyness, and superiority or intolerance of an experimental class which used AR and of a control class which did not.
6. To determine whether or not various academic factors correlate with the degree of verbal communication skill possessed by students or amount of improvement in such skills. Factors considered were cumulative grade point average, reading achievement, language achievement, total battery achievement, reading aptitude, language aptitude, and total battery aptitude.

7. To determine the attitudes of students and teachers towards the value of using AR.

8. To develop AR curriculum materials.

A pretest of verbal communication skill was administered to 42 Northglenn High School business and office (BOE) students during the first week of the first semester of the 1975-76 school year. A pretest self-appraisal inventory was also administered which measured superiority and intolerance, shyness, and confidence in verbally participating in class. These same tests were administered during the last week of the same semester.

One group (20 students) was designated an experimental group and used AR. The other group (22 students) served as a control group who did not use AR. The same teacher was matched to the control and experimental groups.

Student verbal communication skill was measured on both the pretest and posttest by two trained evaluators. The evaluators rated the content, organization, use of language, and delivery of students' recorded responses to a question similar to one which might be asked in a job interview.

Null Hypothesis 1. There was no significant increase in verbal communication skill of students who used AR for one semester. AR was used only about 10 percent of the time, less than one class period a week. There is much room for improvement, as evidenced by below-average scores on an instrument measuring verbal communication skill. Table 5 of Section IV shows mean item scores. It is possible that improvement would take place as AR was used more.

Null Hypothesis 2. There was no significant decrease in superiority and intolerance of students who used AR for one semester. Tables 8 and 9 of Section IV show that males showed significantly more superiority and intolerance of others than females. Overall, students generally replied that they "mostly disagree" with statements such as, "I feel that I am better than most people," and "I don't like people whose beliefs and values are different than mine."

Null Hypothesis 3. There was no significant decrease in shyness of students who used AR for one semester. In general, students replied that they "agree as much as disagree" with statements such as, "When I'm in a group, I usually don't say much for fear I will say the wrong thing." Since shyness is quite directly related to verbal communication skill, it is probable that it would decrease as verbal communication skill increased. It is possible that students would benefit in both areas with increased use of AR.

Null Hypothesis 4. There was a significant increase at the .05 level in confidence in verbally participating in class for those students who used AR for one semester. There was not a significant increase for the control group. Students generally replied that they "agree as much as disagree" with statements such as, "I enjoy taking part in class discussions."

Those students who scored in the top half of the class on the pretest of verbal communication skill, significantly increased at the .05 confidence level in verbally participating in class after using AR for one semester. A significant difference was not found for students who scored in the bottom half of the class on initial verbal communication skill.

VIII. CONCLUSIONS AND
RECOMMENDATIONS
Phases Two and Three

VIII. CONCLUSIONS AND RECOMMENDATIONS

Phases Two and Three

In summary, students who used audio-response (AR) in business and office education (BOE) classes at Northglenn High School showed significantly greater improvement in delivery aspects of verbal communication skill. The improvement was achieved in a short period of time, nine weeks, and continued throughout the semester. The improvement was realized with a limited amount of use, less than once a week during a 48-minute class period. Significant improvements continue for students who use AR for more than one semester. Initial differences in verbal communication skill were controlled in analyzing the benefits of using AR.

In one semester, students did not significantly improve verbal communication skill when all aspects of the skill were measured, such as content, organization, use of language, and delivery. Although AR did not have an effect on shyness or superiority and intolerance in one semester, it did significantly improve a student's confidence in verbally participating in class. Perhaps increased exposure to AR would affect these cognitive and affective areas.

For the experimental group who used AR, seniors had superior communication skill to other grade levels, with sophomore the lowest level of skill. For the control group who did not use AR, sophomores scored the highest and seniors the lowest. Males tended to have an initially lower level of skill than females in verbally communicating. Effects of AR could not be analyzed.

AR can be adapted to a wide variety of BOE classes with a minimum amount of teacher planning time, about 3.6 percent of planning time. Classes in which it was most successful were careers in business and business communications. Students in these classes improved their verbal communication skill more than students in shorthand I classes.

The teachers and students expressed a positive opinion of the benefits of AR. Its greatest advantages appear to be in helping students and teachers carry on conversations, in adding variety to teaching techniques, in improving listening skills, and in learning certain class content easier.

The level of verbal communication delivery skill of students is initially about average and is brought to an above average level with the use of AR. When all aspects of verbal communication skill are considered, including content, organization, use of language, and delivery, students show a below-average level of skill. There was general consensus on the need for improvement and the benefits of AR for such a purpose in BOE classes.

More intensive use of AR with a convenient physical arrangement for the equipment is recommended. AR equipment would consequently have higher utilization and greater benefit for students and teachers. The same equipment has other uses for labs, independent and individualized study, word processing centers, and dictation-transcription practice.

IX. RECOMMENDATIONS
FOR PHASE FOUR

1976-77

IX. RECOMMENDATIONS FOR PHASE FOUR

1976-77

The research situation at Northglenn High School is ideal in many aspects--the cooperation of teachers, the large number of students and BOE classes for setting up the research design, the support of vocational and other school administrators. There are presently some disadvantages. Teachers who participate are volunteers so some classes which would adapt well to AR are not included in the research design.

Also, equipment could not be permanently set up in classes using AR. The mobile storage cabinets are a successful alternative but are not an ideal situation. The time and inconvenience involved in setting up and putting away equipment was a discouragement to greater use of the equipment. There is a future possibility of working out a better arrangement for use of AR since a word processing center is being planned for the 1976-77 school year. The NGHS BOE personnel have conscientiously worked AR and this research study into their program planning.

For future research, a research design similar to the ones used in phases one through three of this project would be used. An aspect of AR use not yet studied, but incorporated into the three-year plan is to measure possible differences in dependent variables for students who have used AR for three or more semesters.

This year's studies found significantly more improvement in verbal communication delivery skills of students who used AR for two semesters as opposed to one semester. Though there was no significant improvement in one semester in verbal communication skill which included content and delivery, increased use would probably show improvement. I would expect affective measurements of shyness and superiority to decrease with use of AR, but only over an extended period of time. Retention of skill could also be measured.

Another aspect not yet fully studied as it relates to AR is job interview success. Questions similar to those used in job interviews were used to measure verbal communication skills. However, the transfer of this ability to an actual job interview situation is important. Northglenn High School advisory committee members could be solicited to assist with interview rating of BOE cooperative education students.

APPENDIX A

INTRODUCTORY DATA

Miss Carol Follenberg
Northton High School
Northton, Colorado 80233

Dear Miss Follenberg:

I promised to give you my thoughts on the needs of business related to new employees.

First, we need people who can express themselves. Generally, this involves use of the English language. We need people who can express what they know and do in terms that others can understand. And, of course, we need people who themselves can read and listen to instructions and convert them into action.

Secondly, we need people who have had practice in learning. This relates somewhat to the second portion of my first point above -- but deals more with the action. I'm thinking of coding in particular. Everything in a computer is coded. These codes must be translated and then certain actions taken as a result. Learning the coding is one thing -- taking action, such as writing a letter, making a refund, etc., is the next or action step.

Thirdly, basic arithmetic. We need people who understand percentages, not solid calculus. The prices of apples and oranges would do. A mark up of 5% or a discount of 10%. The setting of decimal points and the use of common sense to see that the result is reasonable.

Fourth is probably not a teachable subject in these times. However, the function of business in today's economy is a most necessary subject. We receive people skeptical of our motives and doubtful of the importance of our right to exist. Yet it takes little figuring to realize that when business goes so goes our nation's ability to tax other than its own. Our people learn by observing and being a part of it, but others who may not have the opportunity to see the facts are being short changed. For example, our problems with the Social Security structure because of the decline in the birth rate, etc., could be better provided for by private industry on a more solid basis.

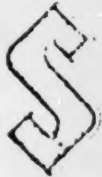
This last point is controversial because it is not popular, consequently there may be little you can do about it. But we do need to learn more about our economy and its structure.

I hope these points -- though beyond what you may have had in mind -- may help.

Sincerely,



Wm. C. Neu
Vice President and Secretary



Security Life
of Denver

UNIVERSITY NATIONAL
BANK

300 EAST DALL AVENUE

DENVER, COLORADO 80202

TELEPHONE 757-7222

June 7, 1974

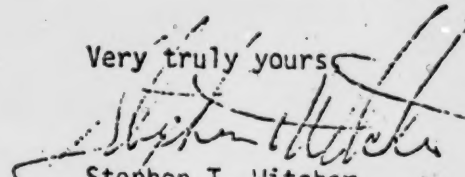
Miss Carol K. Fillenberg
Northglenn High School
Northglenn, Colorado 80233

Dear Miss Fillenberg:

Since I do the majority of interviewing for the Bank, I have found that most high school students lack the confidence that is needed in an interview. Also most of the students are very shy and are afraid to state how they are able to benefit the bank by the skills they possess.

Hopefully your new program will help them gain confidence and they will gain the poise needed for an interview.

Very truly yours,



Stephen T. Witcher
Assistant Cashier

STW/mlh

CASE STUDY

Peggy is a senior in high school. She is going to graduate without even knowing the difference between the spelling of "their" and "there." I feel Peggy is just an example of one of many students who have learned how to get promoted without obtaining a sufficient amount of knowledge. Getting promoted without working is not the real problem. The problem consists of her dealing with our present modern and complex world without sufficient knowledge.

Peggy has probably been promoted for she knows how to work on teachers' guilt feelings. I am sure one of her teachers probably thought "this girl is really trying hard, but I have not been able to reach her." The teacher probably had to rationalize these guilt feelings away by the fact that she had 25 other students and could not always meet individual needs (especially when the individual always seemed to have a problem.)

The above paragraph about Peggy's past teacher is not fact. However, the story could very well be true. Studies have been done that show that the self-concept is related to grades and school success.

Peggy appears to be a perfect example of a girl with a poor self-concept. This statement is made only after observing Peggy's behavior in school. She constantly refers to herself as slow. She has made comments admitting that she feels that she is unattractive. By pure observation one could see that Peggy does not spend any time on her appearance. From my observation of Peggy I feel that she thinks she is not capable of success.

By the time a person has reached their senior year in high school, this concept is hard to change. Peggy is an example of a person who could have been helped by tutoring if she had been reached at an earlier stage. Realizing that funds are not always available at the elementary school level, we must take advantage of individualizing instruction whenever we can. I have worked with Peggy on basic skills. However, the sad part is that Peggy has learned to deal so much with failure that she does not want to be singled out, but wants only to slide by without being noticed.

My recommendation would be that we work with students like Peggy at least by the tenth grade. Teachers should not have guilt feelings about situations that they cannot control. Having more tutors available is just one solution to this educational and social problem. The tutors must have empathy toward students with Peggy's problem. The tutors should have counseling knowledge or be able to make use of other professionals in the school to deal with such problems as self-concept.

CASE STUDY

When I first met Dan, he struck me as a very slow learner. He seemed to have some emotional problems also. I was asked to help him in the area of Business and Office Education, specifically Typewriting.

The first few encounters with him were on an exploratory basis. I'm sure he wanted to adjust to me as I did to him. We talked about various things such as his school work, job, home, family, etc. All this time I was trying to teach him the lessons he needed to do for the course. During this time he was doing "F" work. He was not proofreading his work nor making good erasures on the mistakes he did find. He lacked confidence in himself and his typewriting skill.

Dan has an I.Q. of about 90 and can do the work if he wants to. My job was to help him do his work the right way and do it with confidence. This was accomplished by being a friend to him while also being a teacher. He needed that one-to-one atmosphere in order to succeed. He knows the basic typewriting skills, but I went through them again with him to give him more confidence and to see just how much he really did know. I showed him how to correct mistakes properly and how proofreading would raise his grades.

Now I am happy to say he is doing "D" work. I know it's not "A" or "B" work; but he has shown improvement, which is the first step to success. I have seen a slight personality change in that he seems a little more confident of himself and his work. I do feel he needs more individual help in order to succeed in life. Some areas of his overall problem are deep emotional ones that only a specialist could

could help him with, and I am recommending that he get this form of help.

As far as subject matter is concerned, Dan and I went through four individual projects together. I helped him set up and projects and type them correctly. We proofread everything together, and he retyped all papers necessary. We also worked on timed writings as well as all the basic typewriting skills.

Dan would revert back to his bad habits when I was not around, and he needed encouragement all the time. I feel this should be continued next year in order that he will retain even more than he did under me this year. His higher grade proves that he is retaining the material to some extent.

In conclusion, I feel that young people like Dan need individual help in order to succeed in life. I am totally in favor of the tutoring program and felt it was a valuable experience for me as a future teacher.

APPENDIX B

TEACHER REPORT DATA

AUDIO-RESPONSE ACTIVITIES REPORT

Teacher _____

Period _____

Subject _____

Class soph____ jr____ sr____

Week from ____ / ____ to ____ / ____

Estimate of time spent in audio-response (AR) activities in class:

Day	AR Minutes	Check Type of Activity				Objective
		Talk	Listen	Read	Write	
M						
Tu						
W						
Th						
F						
		Total Weekly Audio-response Minutes				

No ☐Yes ☐

Although you probably spent time planning AR, did you
need to spend a significant amount of extra time in order
to use AR this week?

____ % of planning time used for AR planning

Description of new or successful uses and favorable feedback:

APPENDIX C

VERBAL COMMUNICATIONS DATA
Phase Two

VERBAL COMMUNICATION

SELF EVALUATION

To be filled out by person making response: Sophomore ☐ Junior ☐ Senior ☐

No. of semesters of audio-response classes you've taken (incl. this one) _____

Teacher _____ Period _____ Date _____

As you listen to your own response, judge it on the scales below by placing an X in one of the five spaces on each scale. There should be only one X per line. Ignore the score column for now.

☐ Place an X in this box if you gave no response.

The manner in which I responded is

flustered/hesitant _____ : _____ : _____ : _____ : _____ poised/confident

thoughtful _____ : _____ : _____ : _____ : _____ careless

interesting _____ : _____ : _____ : _____ : _____ boring

without conviction _____ : _____ : _____ : _____ : _____ convincing

SCORE

TOTAL SCORE

SCORING DIRECTIONS: Please be certain you have filled in the information requested at the top of this form and the Peer Evaluation. Do not put your name on them. The scores are for your own information and to obtain average group statistics for a research project conducted by the State Board of Education. These scores will not affect your grade or be used in any way by your teacher.

Line up the transparency provided by your teacher over this sheet. Find the X you marked on each line and write the number assigned to that space in the score column. Then add the 4 numbers in the score column to get your Total Score.

Staple your Self Evaluation on top of the Peer Evaluation of your response.

VERBAL COMMUNICATION

PEER EVALUATION

To be filled out by person making response: Sophomore ☐ Junior ☐ Senior ☐

No. of semesters of audio-response classes you've taken (incl. this one) _____

Teacher _____ Period _____ Date _____

To be filled out by peer evaluator: As you listen to the response given, judge it on the scales below by placing an X in one of the five spaces on each scale. There should be only one X per line. Ignore the score column for now.

☐ Place an X in this box if no response was given.

The manner in which this person responds is

flustered/hesitant _____ : _____ : _____ : _____ : _____ poised/confident

thoughtful _____ : _____ : _____ : _____ : _____ careless

interesting _____ : _____ : _____ : _____ : _____ boring

without conviction _____ : _____ : _____ : _____ : _____ convincing

SCORE

TOTAL SCORE

SCORING DIRECTIONS: Please be certain the information requested at the top of this form has been filled in by the person who made the response. The score will be used to obtain average group statistics for a research project conducted by the State Board of Education. This score will not affect the person's grade or be used in any way by your teacher.

Line up the transparency provided by your teacher over this sheet. Find the X you marked on each line and write the number assigned to that space in the score column. Then add the 4 numbers in the score column to get the Total Score.

The Self Evaluation will be stapled on top of this Peer Evaluation for the same response.

VERBAL COMMUNICATION

TEACHER EVALUATION

To be filled out on person making response: Sophomore ☐ Junior ☐ Senior ☐

No. of semesters of audio-response classes taken (incl. this one) _____

Teacher _____ Period _____ Date _____

To be filled out by teacher evaluator: As you listen to the response given, judge it on the scales below by placing an X in one of the five spaces on each scale. There should be only one X per line. Ignore the score column for now.

☐ Place an X in this box if no response was given.

The manner in which this person responds is

flustered/hesitant _____ : _____ : _____ : _____ : _____ poised/confident

thoughtful _____ : _____ : _____ : _____ : _____ careless

interesting _____ : _____ : _____ : _____ : _____ boring

without conviction _____ : _____ : _____ : _____ : _____ convincing

SCORE

TOTAL SCORE

SCORING DIRECTIONS: Please be certain the information requested at the top of this form and the Self and Peer Evaluations has been filled in.

Line up the scoring transparency over this sheet. Find the X you marked on each line and write the number assigned to that space in the score column. Then add the 4 numbers in the score column to get the Total Score.

The Self Evaluation should be stapled on top of the Peer Evaluation, and then this Teacher Evaluation stapled on the bottom.

POOL OF QUESTIONS

AR Self and Peer Evaluation

1. What kind of memories do you have of your school experience so far?
2. How do you spend your "free" time?
3. How could Northglenn High School be made a better place for you to gain an education?
4. What do you wish you could be doing now rather than being at school?
5. What are your thoughts about the Women's Liberation Movement?
6. How would you raise your children different from or the same as the way you were raised.
7. What qualities in a boy friend would be annoying to you and what qualities do you like?
8. What personal qualities would you like your best friend to have?
9. What are your plans for the future?
10. What qualities, skills, and knowledge do you have that would make you a good employee for someone?
11. By what outward signs do you judge people when you first meet and talk to them?
12. Give some situations in which you could help others to be positive by giving them positive reinforcement.
13. What advice would you give to someone who asked you how to succeed in school? (could change to "in this class")
14. How can you use what you learn in this class now or sometime in the future?
15. Assume that you have obtained the job you want but would like to be promoted. What are some of the steps you should take to become promotable?
16. What can you do at an interview for a job to help sell yourself?

DEFINITIONS--AR SELF AND PEER EVALUATIONS

flustered/hesitant--falters; stammers;
is nervous; confused;
unsure; reluctant or waits
too long to speak because
of doubt, indecision,
unwillingness

thoughtful--careful; conscientious;
thinks through response

interesting--absorbing; pleasant;
holds attention;
enthusiastic

without conviction--not persuasive;
doesn't believe strongly in
what saying; uncertain;
doubtful; not concerned
about adequately responding

poised/confident--composed; has self
control; calm; sure of
oneself; decides what to
say and says it; speaks out

careless--reckless; unconcerned; speaks
without paying enough attention
to what saying

boring--tiresome; repetitious; tedious;
dull in voice or content;
no feeling or interest

convincing--shows a firm belief;
persuades; causes one to
believe what is said;
answers sufficiently

VERBAL COMMUNICATION EVALUATION
Phase Two
Self-Peer-Teacher

This evaluation should be given as a pretest before AR is ever used this semester. The Self, Peer and 5 Teacher evaluations will be given for experimental and control groups at the beginning of the semester and at the end. In addition, the Self and Peer evaluations will be given for the experimental groups one time in between. Allow a full period the first time this evaluation is given, since it will be the first time AR is used.

If it would be helpful for students to know the benefits of good verbal communications or using AR, some are listed on pages 81-82 of the 1974-75 Final Report for AR. Objectives are also listed in the middle of page 78 and at the top of page 79.

After everyone is ready, a questions is given (see Pool of Questions on page 56 of the Report). Students should not write anything down but give an extemporaneous response.

Heading

See the Self Appraisal Section of the Teacher Directions for heading procedures. Distribute an AR Self and Peer Evaluation form to each student. Have the student fill out the heading on both forms. Check for completeness while students are marking or scoring the forms, or when handed in.

Procedure

You can approach this as a fun day to be a part of an experiment and at the same time see their progress in verbally communicating. Answering a question in a machine should be more fun than assignments and homework. Only overall averages will be calculated.

Allow ample time for going over the directions and the entire form before giving the question students will respond to. A general understanding of the terms used is all that is necessary--definition sheets may help.

The entire class should answer the same question selected from the Pool of Questions on page 56 of the 1974-75 AR Final Report.

Distribute a belt to each student if not already in machine, give the question, and let students talk the answer into the microphone to record it (question may be written on board).

Students in more than one experimental or control group should only take the pretest once. Thereafter, they should participate in all of the evaluations. Keep track of makeups since a score is needed for every student.

Evaluating and Scoring

The box following the directions would be checked if absolutely nothing was said in response to the question. If the box for no response is checked, the remaining portion of the form would not be filled out.

Verbal Communication Evaluation Continued

Distribute a definitions sheet to each student to help with the evaluating. The pair of words for each scale are opposite in meanings. Students are judging to what degree the listed qualities are present.

Using a transparency, have students score their own self evaluation but have the peer evaluator score the peer evaluation. Emphasize again that you are not grading them on their progress. If they understand how improved verbal communications is helpful to them, they will better understand these exercises. Students can write down their scores if they would like to compare them to later scores, or I will have them on file.

Staple the Self Evaluation on top of the Peer Evaluation for the same response and have turned in with the belt. This is so that you can evaluate five of the responses. The gray folders would probably work best for turning them in until you can select five of them so that the belts are not damaged or lost. If there is any chance of the belts getting mixed up, have students give their I.D. No. before they respond on the belt.

Teacher Evaluation

Shuffle the self-peer evaluations and draw 5 from the experimental class and 5 from the control class so that they are random choices. Fill out the heading, evaluate, score, and attach yours to the top of the self and peer evaluations (so I can spot them easily).

1975-76 AR SEMESTER SCHEDULE

Week 2 or 3	Self Appraisal Inventory	to experimental & control groups before AR has been used
	Verbal Communication	
	Self-Peer-Teacher Evaluation	to experimental & control groups before AR has been used
Week or	Verbal Communication	
	Self and Peer Evaluation	to experimental group
Week 17 or 18	Verbal Communication	
	Self-Peer-Teacher Evaluation	to experimental & control groups
	Self Appraisal Inventory	to experimental & control groups
	Student and Teacher Questionnaire	to experimental group
Weekly	Teacher AR Activities Report	with experimental group use AR as much as possible

APPENDIX D

SELF-APPRAISAL DATA

SELF APPRAISAL INVENTORY

Directions

Please show whether you agree or disagree with each of the numbered statements on the following pages by marking one of the spaces on the answer sheet.

a = Completely Agree b = Mostly Agree c = Agree As Much As Disagree d = Mostly Disagree e = Completely Disagree

For example:

	a.	b.	c.	d.	e.
I want to be a movie star.	_____	_____	_____	<u> X </u>	_____
I like chocolate cake.	<u> X </u>	_____	_____	_____	_____

There are no right or wrong answers, so respond to each statement as honestly as you can.

Ignore the scoring columns. The score will be used for a research project conducted by the Colorado State Board for Community Colleges and Occupational Education to obtain average group statistics. This score will not affect your grade or be used in any way by your teacher. Therefore, please fill out this inventory seriously, or else it is preferred it not be turned in at all.

Do not write your name on the answer sheet but please fill in the other information requested at the top of the answer sheet before you begin.

SELF APPRAISAL INVENTORY

a = Completely Agree b = Mostly Agree c = Agree As Much As Disagree d = Mostly Disagree e = Completely Disagree

1. I can be friendly with people who don't believe as I do.
2. I worry about what people think about me.
3. I can't express my ideas very well in class.
4. I can't help feeling that I am better than most of the people I know.
5. I find it hard to talk when I meet new people.
6. I enjoy taking part in class discussions.
7. I tend to be critical of others.
8. I am afraid people will laugh at me if I say something wrong or do something stupid.
9. I can speak out in class discussion most of the time when I want to.
10. I feel that people should associate with their own kind.
11. I feel uncomfortable around people I don't know.
12. I find it hard to talk in front of class.
13. I feel that I am better than most people.
14. I would rather be with a good friend than with a lot of people I don't know too well.
15. I get nervous and tense when I'm called on in class.
16. When others make an error I point it out to them.
17. I am a shy person.
18. I like to be called on in class.
19. I don't like people who are very different from me.
20. When I'm in a group, I usually don't say much for fear I will say the wrong thing.

Self Appraisal Inventory Continued

a = Completely Agree b = Mostly Agree c = Agree As Much As Disagree d = Mostly Disagree e = Completely Disagree

21. I don't like people whose beliefs and values are different from mine.
22. I get stage fright if I have to talk to a group.
23. I can size people up quickly and know whether I will like them or not.
24. I feel nervous when people talk to me.
25. I like to brag about myself.
26. I am easily embarrassed.
27. I find it difficult to compliment someone, even if I think he deserves it.
28. I find it hard to accept some people who are different from me as equals.

SELF APPRAISAL ANSWER SHEET

I.D. :

No. of semesters of audio-response classes taken (including this one) _____

Date _____ Grade soph ☐ jr ☐ sr ☐a = Completely
Agreeb = Mostly
Agreec = Agree As Much
As Disagreed = Mostly
Disagreee = Completely
Disagree

SCORING

	a.	b.	c.	d.	e.	SCORING	
1.	_____	_____	_____	_____	_____		
2.	_____	_____	_____	_____	_____		
3.	_____	_____	_____	_____	_____		
4.	_____	_____	_____	_____	_____		
5.	_____	_____	_____	_____	_____		
6.	_____	_____	_____	_____	_____		
7.	_____	_____	_____	_____	_____		
8.	_____	_____	_____	_____	_____		
9.	_____	_____	_____	_____	_____		
10.	_____	_____	_____	_____	_____		
11.	_____	_____	_____	_____	_____		
12.	_____	_____	_____	_____	_____		
13.	_____	_____	_____	_____	_____		
14.	_____	_____	_____	_____	_____		
15.	_____	_____	_____	_____	_____		
16.	_____	_____	_____	_____	_____		
17.	_____	_____	_____	_____	_____		
18.	_____	_____	_____	_____	_____		
19.	_____	_____	_____	_____	_____		
20.	_____	_____	_____	_____	_____		

	a.	b.	c.	d.	e.	SCORING
21.	_____	_____	_____	_____	_____	
22.	_____	_____	_____	_____	_____	
23.	_____	_____	_____	_____	_____	
24.	_____	_____	_____	_____	_____	
25.	_____	_____	_____	_____	_____	
26.	_____	_____	_____	_____	_____	
27.	_____	_____	_____	_____	_____	
28.	_____	_____	_____	_____	_____	

IERSC AFFECTIVE SUBSCALES

<u>Sub Scale</u>	<u>Item</u>	<u>Scale Titles and Item Statements</u>
1		<u>Verbal Participation in Class</u>
	50	I find it hard to talk in front of class.
	52	I get nervous and tense when I'm called on in class.
	53	I like to be called on in class.
	48	I enjoy taking part in class discussions.
	51	I can speak out in class discussion most of the time when I want to.
	29	I can't express my ideas very well in class.
2		<u>Shyness</u>
	41	I worry about what people think about me.
	61	I find it hard to talk when I meet new people.
	64	I am afraid people will laugh at me if I say something wrong or do something stupid.
	66	I feel uncomfortable around people I don't know.
	67	I would rather be with a good friend than with a lot of people I don't know too well.
	70	I am a shy person.
	73	When I'm in a group, I usually don't say much for fear I will say the wrong thing.
	76	I get stage fright if I have to talk to a group.
	79	I feel nervous when people talk to me.
	80	I am easily embarrassed.
3		<u>Superiority and Lack of Tolerance</u>
	3	I can be friendly with people who don't believe as I do.
	18	I can't help feeling that I am better than most of the people I know.
	20	I tend to be critical of others.
	24	I feel that people should associate with their own kind.
	26	I feel that I am better than most people.
	31	When others make an error I point it out to them.
	33	I don't like people who are very different from me.
	39	I don't like people whose beliefs and values are different from mine.
	46	I can size people up quickly and know whether I will like them or not.
	51	I like to brag about myself.
	52	I find it difficult to compliment someone, even if I think he deserves it.
	56	I find it hard to accept some people who are different from me as equals.

ITEM ANALYSIS

THE MEANING OF IERSC AFFECTIVE SUBSCALE SCORES

<u>Subscale</u>	<u>Possible Range if Scores</u>	<u>The higher the score the more . . .</u>
1	6 - 30	confident of verbally participating in class.
2	10 - 50	shy, withdrawn, and self-conscious.
3	12 - 60	superior and intolerant.

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SELF APPRAISAL ANSWER SHEET

I.D.

No. of semesters of audio-response classes taken (including this one) _____

Date _____ Grade _____ soph ☐ jr ☐ sr ☐

a = Completely Agree b = Mostly Agree c = Agree As Much As Disagree d = Mostly Disagree e = Completely Disagree

SCORING										SCORING									
a.	b.	c.	d.	e.						a.	b.	c.	d.	e.					
1. 1 X	2	3	4	5	1					21. 5	4	3	2	1 X	1				
2. 5	4	3	2	1 X		1				22. 5	4	3	2	1 X		1			
3. 1	2	3	4	5 X				5		23. 5	4	3	2	1 X		1			
4. 5	4	3	2	1 X	1					24. 5	4	3	2	1 X		1			
5. 5	4	3	2	1 X		1				25. 5	4	3	2	1 X		1			
6. 5 X	4	3	2	1				5		26. 5	4	3	2	1 X		1			
7. 5	4	3	2	1 X	1					27. 5	4	3	2	1 X		1			
8. 5	4	3	2	1 X		1				28. 5	4	3	2	1 X		1			
9. 5 X	4	3	2	1				5											
10. 5	4	3	2	1 X	1														
11. 5	4	3	2	1 X		1													
12. 1	2	3	4	5 X				5											
13. 5	4	3	2	1 X	1														
14. 5	4	3	2	1 X		1													
15. 1	2	3	4	5 X				5											
16. 5	4	3	2	1 X	1														
17. 5	4	3	2	1 X		1													
18. 5 X	4	3	2	1				5											
19. 5	4	3	2	1 X	1														
20. 5	4	3	2	1 X		1													

SELF APPRAISAL INVENTORY

Phase Two

This will be administered to experimental and control groups at the beginning of the semester and at the end. There are 30 stapled appraisals for each teacher. It will probably be necessary to allow a full period: 15-20 minutes to take the appraisal and 15-20 minutes to score and add figures correctly.

Heading

Check for complete headings, perhaps while students are taking the self appraisal.

Give each student an I.D. No.

For the AR No., see the Experimental Group List for last year. List the classes which will be considered AR this semester. "0" is marked if the student is not on last year's list of experimental groups (has never had AR) and is not in any AR classes this semester. A student may have had 1 or 2 AR classes last year (incl. on list) plus any number of AR classes this semester. Include this semester's AR classes in the count of AR classes a student has taken.

If a student is in more than one control or experimental class this semester, the self-appraisal should be taken only once. (The Verbal Communication Self and Peer Evaluation will be repeated, however)

Procedure

There are no "right" or "wrong" answers. If students ask questions regarding interpretations of the statements, state that the inventory calls only for general impressions regarding each statement.

Using a transparency, students can score their own inventory as long as they don't change any ratings. Have the sub-scores and total scores checked for accuracy.

Every item should be marked. If for some reason no response was given for an item, score it as "3--Agree As Much As Disagree."

Keep track of any makeups since a score is needed for every student.

APPENDIX E

QUESTIONNAIRES

STUDENT QUESTIONNAIRE

Soph ☐ Jr ☐ Sr ☐ Teacher _____ Period _____

No. of semesters of audio-response classes you've taken _____ Date _____

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response helped me . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. feel more confident about talking in front of people.	_____	_____	_____	_____	_____
2. speak up more and talk more clearly.	_____	_____	_____	_____	_____
3. participate more in class.	_____	_____	_____	_____	_____
4. express my ideas more freely than giving them in written form on assignments.	_____	_____	_____	_____	_____
5. improve my ability to do oral reading and my speaking ability.	_____	_____	_____	_____	_____
6. learn better.	_____	_____	_____	_____	_____
7. enjoy this class more.	_____	_____	_____	_____	_____
8. be a more careful listener.	_____	_____	_____	_____	_____
9. carry on conversations with others better.	_____	_____	_____	_____	_____
10. be more independent.	_____	_____	_____	_____	_____
11. be more productive.	_____	_____	_____	_____	_____

Comments _____

TEACHER QUESTIONNAIRE

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	_____	_____	_____	_____	_____
2. individualize instruction to meet the needs of more students.	_____	_____	_____	_____	_____
3. get more participation from students in class.	_____	_____	_____	_____	_____
4. get better participation from shy students who otherwise might not have contributed	_____	_____	_____	_____	_____
5. me enjoy teaching the class more.	_____	_____	_____	_____	_____
6. students to speak up more and to word their questions and ideas more clearly.	_____	_____	_____	_____	_____
7. students learn certain material better or easier.	_____	_____	_____	_____	_____
8. the students be more independent.	_____	_____	_____	_____	_____
9. the students be more productive.	_____	_____	_____	_____	_____
10. the students be more careful listeners.	_____	_____	_____	_____	_____

Comments _____

TEACHER QUESTIONNAIRE

Phase Two

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	_____	: <u>X</u> :	_____	: _____	: _____
2. individualize instruction to meet the needs of more students.	_____	: _____	: <u>X</u> :	_____	: _____
3. get more participation from students in class.	_____	: _____	: <u>X</u> :	_____	: _____
4. get better participation from shy students who otherwise might not have contributed	_____	: _____	: _____	: <u>X</u> :	_____
5. me enjoy teaching the class more.	_____	: _____	: _____	: <u>X</u> :	_____
6. students to speak up more and to word their questions and ideas more clearly.	_____	: _____	: <u>X</u> :	_____	: _____
7. students learn certain material better or easier.	_____	: <u>X</u> :	_____	: _____	: _____
8. the students be more independent.	_____	: <u>X</u> :	_____	: _____	: _____
9. the students be more productive.	_____	: _____	: <u>X</u> :	_____	: _____
10. the students be more careful listeners.	_____	: _____	: <u>X</u> :	_____	: _____

Comments

Because of problems involved in setting up and taking down of equipment, I did not use A/R as much as I would have otherwise.

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TEACHER QUESTIONNAIRE
Phase Two

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	_____	_____	✓	_____	_____
2. individualize instruction to meet the needs of more students.	_____	_____	✓	_____	_____
3. get more participation from students in class.	_____	_____	_____	✓	_____
4. get better participation from shy students who otherwise might not have contributed	_____	✓	_____	_____	_____
5. we enjoy teaching the class more.	_____	_____	✓	_____	_____
6. students to speak up more and to word their questions and ideas more clearly.	_____	_____	_____	✓	_____
7. students learn certain material better or easier.	_____	✓	_____	_____	_____
8. the students be more independent.	_____	_____	✓	_____	_____
9. the students be more productive.	_____	_____	✓	_____	_____
10. the students be more careful listeners.	_____	✓	_____	_____	_____

Comments Depended how seriously each student took it. I had done it last year they were not interested at all or if had heard about it.

TEACHER QUESTIONNAIRE
Phase Two

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	_____	_____	✓	_____	_____
2. individualize instruction to meet the needs of more students.	_____	_____	_____	✓	_____
3. get more participation from students in class.	_____	_____	_____	✓	_____
4. get better participation from shy students who otherwise might not have contributed	_____	_____	_____	_____	✓
5. me enjoy teaching the class more.	_____	_____	✓	_____	_____
6. students to speak up more and to word their questions and ideas more clearly.	_____	_____	_____	_____	✓
7. students learn certain material better or easier.	_____	_____	_____	✓	_____
8. the students be more independent.	_____	_____	✓	_____	_____
9. the students be more productive.	_____	_____	✓	_____	_____
10. the students be more careful listeners.	_____	_____	✓	_____	_____

Comments _____

TEACHER QUESTIONNAIRE

Phase Two

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	___	: ☒ :	___	: ___	: ___
2. individualize instruction to meet the needs of more students.	___	: ___	: ☒ :	___	: ___
3. get more participation from students in class.	___	: ☒ :	___	: ___	: ___
4. get better participation from shy students who otherwise might not have contributed	___	: ☒ :	___	: ___	: ___
5. we enjoy teaching the class more.	___	: ___	: ☒ :	___	: ___
6. students to speak up more and to word their questions and ideas more clearly.	___	: ☒ :	___	: ___	: ___
7. students learn certain material better or easier.	___	: ___	: ☒ :	___	: ___
8. the students be more independent.	___	: ___	: ☒ :	___	: ___
9. the students be more productive.	___	: ___	: ☒ :	___	: ___
10. the students be more careful listeners.	___	: ☒ :	___	: ___	: ___

Comments Didn't use it enough during the
Semester - had other things going - class
was completely done on an individual
individual basis - hard to use A/R that way
More trouble than it's worth actually.

TEACHER QUESTIONNAIRE

Phase Two

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	_____	: <u>X</u> :	_____	: _____	: _____
2. individualize instruction to meet the needs of more students.	_____	: _____	: <u>X</u> :	_____	: _____
3. get more participation from students in class.	_____	: _____	: <u>X</u> :	_____	: _____
4. get better participation from shy students who otherwise might not have contributed	_____	: <u>X</u> :	_____	: _____	: _____
5. me enjoy teaching the class more.	_____	: _____	: <u>X</u> :	_____	: _____
6. students to speak up more and to word their questions and ideas more clearly.	_____	: _____	: <u>X</u> :	_____	: _____
7. students learn certain material better or easier.	_____	: <u>X</u> :	_____	: _____	: _____
8. the students be more independent.	_____	: _____	: _____	: <u>X</u> :	_____
9. the students be more productive.	_____	: _____	: _____	: <u>X</u> :	_____
10. the students be more careful listeners.	_____	: _____	: <u>X</u> :	_____	: _____

Comments an area that needs to be developed -
as I used it no judgment can be
made

TEACHER QUESTIONNAIRE

Phase Three

Directions: For the following statements, please mark an X in the blank which best shows how much you agree or disagree with each statement.

The use of audio-response in my class helped . . .

	Completely Agree	Mostly Agree	Agree As Much As Disagree	Mostly Disagree	Completely Disagree
1. vary instruction methods and techniques	—	X	—	—	—
2. individualize instruction to meet the needs of more students.	—	—	X	—	—
3. get more participation from students in class.	—	—	X	—	—
4. get better participation from shy students who otherwise might not have contributed	—	X	—	—	—
5. we enjoy teaching the class more.	—	—	X	—	—
6. students to speak up more and to word their questions and ideas more clearly.	—	X	—	—	—
7. students learn certain material better or easier.	—	—	X	—	—
8. the students be more independent.	—	X	—	—	—
9. the students be more productive.	—	—	X	—	—
10. the students be more careful listeners.	X	—	—	—	—

Comments

Cannot achieve noticeable results in students when only used one semester once a week or less. Still needs to be set up in a lab room so students can use it individually whenever needed. Needs to be used in lots of

15
14
5
3.

X : — : — : — : — (changes)

TEACHER INVESTIGATORS*

Northglenn High School
Business and Office Education

Diane Bakel

Cheryl Daugherty

Peggy Otey

Jane Tapp

Donna Toliver

* Teachers listed participated in phase two of the study. In addition, Jane Tapp participated in phase three.

APPENDIX F

VERBAL COMMUNICATIONS DATA
Phase Three

VERBAL COMMUNICATION EVALUATION

L.R.

No. of semesters of audio-response classes taken (incl. this one) _____

Date _____ Grade soph ☐ jr ☐ sr ☐

Evaluator Instructions: As you listen to the student response, judge it on the scales below by placing an X in one of the five spaces on each scale. A superior rating does not necessarily indicate perfection.

1 = poor 2 = somewhat below average 3 = average 4 = somewhat above average 5 = superior

	1	2	3	4	5
1. Relevancy of content to the question	_____	_____	_____	_____	_____
2. Adequateness of introduction, conclusion, and development of main thought	_____	_____	_____	_____	_____
3. Evidence of sound logic and/or creative thought	_____	_____	_____	_____	_____
4. Effectiveness in making main ideas apparent	_____	_____	_____	_____	_____
5. Clearness of transitions	_____	_____	_____	_____	_____
6. Accuracy of language or wording	_____	_____	_____	_____	_____
7. Vividness and force of wording	_____	_____	_____	_____	_____
8. Use of acceptable pronunciation and projection of voice	_____	_____	_____	_____	_____
9. Use of vocal variety and emphasis	_____	_____	_____	_____	_____
10. Delivery which is direct and communicative	_____	_____	_____	_____	_____
11. Total effectiveness of the response and respondent upon you	_____	_____	_____	_____	_____

TOTAL SCORE _____

TEACHER DIRECTIONS FOR AR TESTS

Phase Three

Follow the same teacher directions as for phase two except for the following modifications:

Verbal Communication Skill

- Administer only pretest and posttest to experimental and control classes.
- Students will not score their responses. Trained evaluators will be used to evaluate and score responses.
- Please use the following question for the pretest: "What can you do at a job interview to help sell yourself?"
- Please use the following question for the posttest: "What qualities, skills, knowledge, and interests do you have that would make you a good employee for someone?"

Self-Appraisal Inventory

- Allow 15-20 minutes to administer the verbal communication test and 5 minutes to administer the self-appraisal inventory.
- Students will not score their own pretest or posttest. I will score them.